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Hyperventilation

JAMES J. SHORT*
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HYPERVENTILATION can be a symptom of both functional and organic disease. It is my purpose to discuss both types and to point out certain of its consequences.

PSYCHONEUROSIS AND ORGANIC DISEASE

Emotional conflicts probably account for a longer list of ailments than any other one common etiologic factor to bring patients to the doctor's office. Many conditions springing from anxieties, maladjustments, and tensions have progressed from the stage of functional derangement to organic disease when seen by the physician. In such category we may safely place peptic ulcer; colitis; primary arterial hypertension, with its cardiac and vascular consequences; endocrine derangements, with their sequelae; malnutrition with deficiency manifestations; and in certain instances, obesity with its offspring, diabetes. And no one can successfully deny that even venereal disease may occasionally stem from a temporary emotional imbalance.

Patients with organic disease usually receive care directed toward the lesion. For instance, the ulcer patient is treated by means of diet, alkalies, antacids, antispasmodics, sedatives, and in severe or complicated cases, surgery. Frequently, however, the important problem of bringing him and his environment into harmony, and thus resolving his emotional conflicts, is completely overlooked. From this oversight springs the tendency to recurrence of ulcer over long periods. It must be admitted, however, that in many cases nothing short of a complete renovation of thought and emotional patterns will suffice to accomplish this. Though desirable, it is often impossible; but an attempt to obtain cooperation and insight should be made.

Patients with many complaints but without evidence of organic disease are the ones most neglected. They shop around from doctor to doctor, from specialist to specialist, from quack to cultist, without relief. Doctors assure them that they suffer from "nerves" or from undue emotional conflicts, all of which may be true but helps little. These unfortunate and numerous patients are often regarded as perverse and ornery. They weary the most patient and conscientious physician until, to borrow an expression from one of my southern colleagues, the doctor desires above all else to "get shet" of them. He therefore heaves a sigh of relief when such patients transfer to the specialist in neuropsychiatry, or even to his competitor just across the street.

THE PSYCHONEUROTIC HYPERVENTILATOR

In this group comes the psychoneurotic hyperventilator. He—or more frequently *she*—is a

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JAMES J. SHORT

common problem; but despite the excellent descriptions of signs and symptoms which have been published in the medical literature,[1-3] the basic cause of the symptoms frequently goes unrecognized.

Kerr and his colleagues[1] stated that anxiety states with hyperventilation as the outstanding manifestation were numerous in the depression years of the 'thirties. I doubt if they are less common at the present time.

Symptoms can be alarming, even terrifying. To appreciate this fully I would suggest that every doctor present try hyperventilating to utmost capacity for a period of from three to six minutes. Symptoms follow a fairly consistent pattern. Lightheadedness, dizziness, tingling of hands and feet, palpitation or heart consciousness, and muscle cramps are often described by patients. In addition, muscle weakness, apprehension, fear of collapse, and a general loss of self-confidence should be emphasized.

ILLUSTRATIVE CASES

E. C., an engineer about 35 years of age, was engaged as a teacher of mathematics in the New York City high schools. He had suffered from migraine since early life but was steady and reliable and in generally good health. During the war, a combination of circumstances raised anxiety and apprehension above his threshold of tolerance and he began to suffer alarming symptoms which added greatly to his anxiety and shook his confidence in his ability to carry on. He was obliged to take sick leave.

After examination by a competent internist, who told him there was nothing wrong, he went to a psychiatrist who suggested an institution for nervous disorders. The sight of bars at the windows and locked doors further depressed him, and he finally took refuge in a sanatorium for general conditions in so prostrated a condition that he was confined to bed for weeks.

Gradually his strength came back so that he could do some occupational therapeutic procedures and ultimately be discharged. Still weak, but somewhat less miserable, he returned to his duties. It was not until severe symptoms were provoked by voluntary hyperventilation and the nature of his weakness explained to him that he recovered his usual health. He grasped the physiologic significance of his symptoms immediately and gave full cooperation. His symptoms disappeared, his self-confidence was restored, and he has carried a full load of teaching ever since.

C. W., the daughter of a physician and an ex-Hollywood screen star, had met with many disappointments in life. At 45 she was a semi-invalid with many symptoms and complaints, chief of which were collapsing spells, weakness, palpitation, lightheadedness, cramping of facial muscles, coldness of hands, etc. She volunteered the information that she was wont to bind her lower ribs tightly to prevent overbreathing.

Her outstanding complaint was inability to maintain even moderate sustained activity on account of great prostration and weakness. She was frequently embarrassed by faintness and collapse, especially in crowds or during excitement. She did not lose consciousness completely, but complained of feeling dazed and of being unable to comprehend what was being said to her. Loss of self-confidence and personality deterioration progressed to a state of utter helplessness and were distressing to behold. Prolonged medical and psychiatric care had accomplished little. She expressed great concern for her reason.

Physical examination disclosed no organic disease; in fact, she appeared about ten years younger than her stated age of 45. The familiar pattern of symptoms suggested that hyperventilation was the direct cause of the more distressing manifestations. When this was explained to her, she was skeptical.

"But, doctor, there must be something else," was her response.

Subsequently, she was rested one morning for some laboratory studies on hyperventilation. She volunteered the suggestion that it was a poor time for such studies since she was feeling exceptionally well and strong that morning. A three-minute period of forced breathing was proposed for the study. Before the period had elapsed, she complained of her usual symptoms. At the end of the period she was completely prostrated. Twenty minutes later she felt well enough to get up. She was apparently in possession of her faculties and emotionally undisturbed. However, while adjusting her hair, her knees gave out and she collapsed help-

lessly on the floor. She was not unconscious, though obviously embarrassed by her weakness. She felt limp when we attempted to lift her. Carbon dioxide gas blown into her face caused quick restoration, and she left without further incident. On her next visit she stated that she was convinced of the role of overbreathing in producing the collapse.

E. S., female, aged 48, had much the same symptoms as the foregoing case. She had a long psychoneurotic background. Prostration with much confinement to bed was an outstanding feature. There was found no evidence of organic disease. During the physical examination, she was caused to overbreathe by purposely prolonged auscultation of the chest. At the close of the examination she was complaining loudly of dizziness, numbness, and tinglings, but especially of weakness. She was unable to dress herself and had to be put to bed. In her distress she was sighing deeply and continuing to hyperventilate, though completely unaware of what had been done to provoke the attack. She constantly reiterated the question, "Oh, doctor, what did you do to me?"

Inhalation of carbon dioxide produced temporary restoration. Since she had no understanding, the sequence of events was explained to her.

I, myself, instructed a technician to notify me when three minutes of voluntary hyperventilation were up and to take a venous pressure at that time. Although unaware of any lapse of consciousness, I failed to hear the spoken voice at three minutes or to feel the venipuncture.

In the foregoing illustrative cases, weakness, exhaustion, collapse, partial invalidism, and lowered sensibility were outstanding features. This inability to carry on, and fear of collapse greatly add to pre-existing anxieties until the former are sometimes eclipsed altogether and the patient states that his only anxiety is his health. Lack of understanding and the fear that the physician may suspect malingering further intensify the symptoms and also perpetuate the syndrome.

PROBLEMS FOR INVESTIGATION

Hyperventilation properly means respiration beyond the physiologic requirements of the organism. Normally the rate and depth of respiration are delicately adjusted to the body's needs and are regulated chiefly by the concentration of carbon dioxide in the blood stream. This very active and physiologically important gas is the chief factor in respiratory regulation. The late Yandell Henderson stated that carbon dioxide and the relative sensitivity of the respiratory center to it are the principal factors involved.[4] He found that a slight degree of oxygen want increased the excitability of the respiratory center, probably through the carotid mechanism, but that severe oxygen want depressed it. He lamented the usual assumption that the excitability of the center is unvarying.

To comprehend the delicacy of respiratory control, it is only necessary to cite the findings of Haldane and Priestley[5] that in man a rise in the carbon dioxide of the alveolar air of only 0.2 per cent (equivalent to a pressure increase of 1.5 mm. of mercury) was sufficient to double the pulmonary ventilation.

In the consideration of hyperventilation, as we see it clinically, the following questions present themselves. Through what mechanism do emotions stimulate respiration beyond the needs of the organism? How can this imbalance best be controlled? What is the relationship between the overbreathing and the alarming symptoms which it produces? Must we rely on clinical evidence alone for diagnosis, or can a simple, satisfactory test be found to determine the presence of hyperventilation?

Many excellent clinical and laboratory studies on the subject have appeared in the literature,[6-11] but numerous questions still remain.

EXPERIMENTAL OBSERVATIONS

While engaged in studies of this problem in the Navy during the late war, I was impressed with the need for an objective method for diagnosing hyperventilation, and suggested the measurement of respiration volume in relation to surface area as a possible procedure.[12] Since suitable equipment was not available, the project was postponed until after the war when I consulted an old friend and colleague, Dr. C. V. Bailey, at the Respiration Laboratory of the late-lamented New York Post-Graduate Hospital. It was gratifying to find that he and Boyer had already collected and published data on this problem.[13]

Boyer and Bailey found only a fair correlation in normal subjects between surface area and ventilation volume, but an excellent correlation between carbon dioxide production and ventilation volume. From this finding it developed that carbon dioxide concentration in the expired air under standard conditions is in itself an excellent index of respiration volume and can be used to test the presence of hyperventilation.

FIGURE 1. Collecting expired air for carbon dioxide analysis. Patient in basal state.

The value of this procedure rests upon the following facts: Carbon dioxide in expired air under basal conditions is normally very constant at all ages in both sexes. It approximates 20 mm. of mercury (about one-half the alveolar tension). Of great importance is the fact that no cooperation from the subject is required other than to lie quietly at rest while a small mask is applied to collect a sample. The cooperation needed for *alveolar* carbon dioxide would probably cause a buildup and vitiate the results.

My associates and I at the Birmingham General (VA) Hospital, Van Nuys, California, have found this method satisfactory in the study of hyperventilation problems. We have confirmed the constancy of the carbon dioxide concentration in the expired air of normal subjects at about 20 mm. of mercury with narrow limits of variation, as affirmed by Boyer and Bailey. The major difficulty with the method is that it involves precise gas analysis, always a somewhat difficult and time-consuming technic. For this purpose we have used the Van Slyke manometric apparatus, though Bailey uses his own modification of the Haldane gas analyzer (Figures 1 and 2).

What our profession needs at the present time is an apparatus which gives accurate direct readings of carbon dioxide concentrations as has been accomplished with oxygen and other gases. So far, in my search for such an apparatus, I have not been able to find one of sufficient delicacy for the small fluctuations involved. Dr. A. O. Beckman of the National Technical Laboratories, South Pasadena, California, tells me that a direct reading apparatus is feasible, and he expects to develop one in the near future for our use. I believe it would have value for anesthesiologists as well as for clinicians since acapnia may well be more common in the operating room than is generally recognized, if Henderson's statements are correct.*

In considering the problem of psychogenic hyperventilation, we have asked ourselves how emotion increases ventilation rate. Since adrenalin is increased in the blood under emotional stress, it seemed possible that it might be a sensitizer of the respiratory center to carbon dioxide, so we have tried the effect of injected adrenalin. If respiration increased merely in proportion to an increase of carbon dioxide from metabolic stimulation, such as one would expect from injected adrenalin, there would be no dilution of carbon dioxide in the expired air.

*I refer those interested to his delightful little monograph entitled "Adventures in Respiration."[4]

The carbon dioxide, in fact, might be expected to increase above the normal tension as we have found that it does following exercise. On the other hand, if adrenalin increased the sensitivity of the center to carbon dioxide, we would expect a decrease in the tension of carbon dioxide in the expired air. Our results to date are not conclusive on this point, but evidence favors the view that adrenalin may be a factor.

We have been especially interested in the mental clouding, exhaustion, and muscle weakness which accompany hyperventilation, and have been especially intrigued with Henderson's experiments which seem to have been quite generally overlooked by most workers in this field. Briefly, Henderson's thesis, for which he adduced much experimental evidence, was that venous return is seriously retarded during acapnia which in some manner causes a loss of muscle tonus. He cited the well-known fact that return of blood from both peripheral and splanchnic areas is dependent to a large degree upon muscle tonicity, and that muscle atonia permits stagnation in the venous capillaries.

To prove this point Riml,[14] in 1929, suddenly stopped the circulation of a narcotized cat by clamping the pulmonary artery. He then opened the right heart. Over half the blood immediately flowed out. Since the heart no longer functioned, the marked blood loss must be explained by the propulsive power of the muscles, including the abdominals. In this connection we may think of muscles as a saturated sponge under pressure. The fluid is propelled at a rate dependent upon pressure exerted and resistance to outflow.

In further support of Henderson's view of muscle atonia and capillary stagnation is the report by Rapoport, et al.[16] that cellular fluid of muscle increases in volume during periods of prolonged hyperventilation in contrast to the findings in blood.

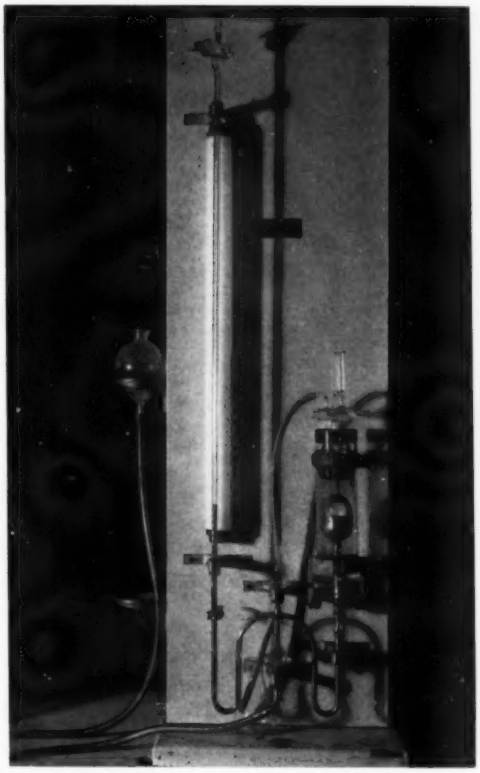

FIGURE 2. Van Slyke manometric apparatus used for analysis of carbon dioxide in expired air.

In our attempts to study effect of voluntary hyperventilation on muscle tonus we have repeated an experiment described by Henderson. An 18-gauge needle with solid point, but with openings on the side, was introduced into the belly of the relaxed biceps and a manometric measurement of the pressure required to overcome internal muscle pressure was measured. Control readings averaged 110 mm. of water which agreed fairly well with Henderson's findings. After maximal hyperventilation for three minutes, this resistance had fallen to 70 mm. Voluntary flexing of the muscle raised the resistance to 360 mm., which indicates the validity of this experiment.

Thinking to get some further information on this alleged impairment of muscular function in acapnia, we have carried out observations by electromyography (Figure 3). Tetanic contractions of the gastrocnemius were recorded in the control and postventilation periods. Marked changes occurred and were interpreted by Dr. A. A. Unger as follows:

> The electromyograms following hyperventilation show an increasing voltage of discharge with a decreasing frequency for about fifteen minutes. The spikes present are judged from their frequencies to be due to spinal discharges. The findings indicate a general decrease in muscle tonus. Recovery is nearly complete in eighteen minutes.

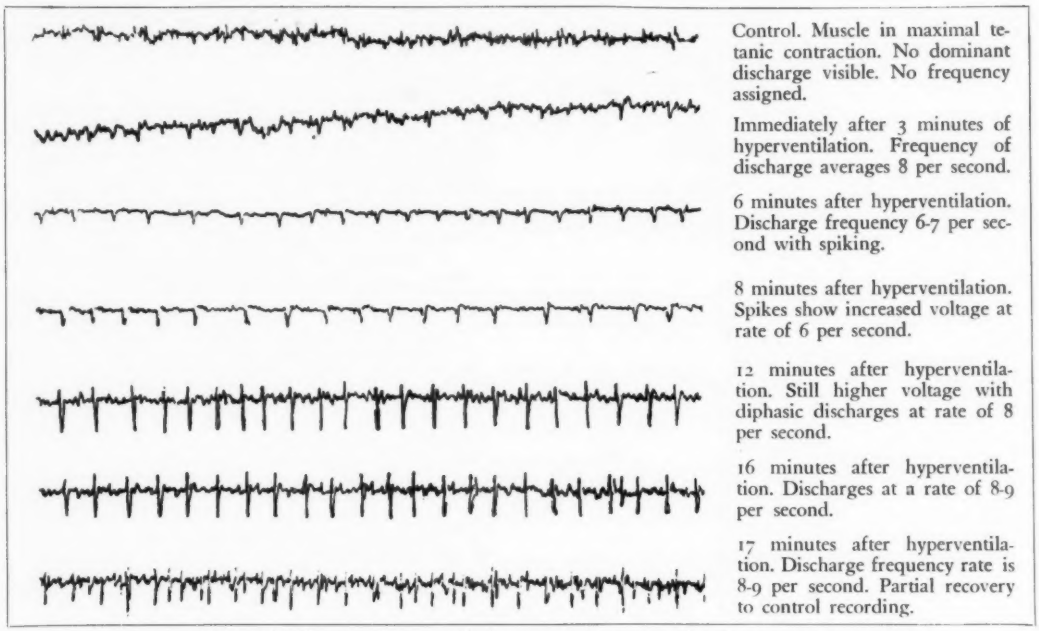
Control. Muscle in maximal tetanic contraction. No dominant discharge visible. No frequency assigned.
Immediately after 3 minutes of hyperventilation. Frequency of discharge averages 8 per second.
6 minutes after hyperventilation. Discharge frequency 6-7 per second with spiking.
8 minutes after hyperventilation. Spikes show increased voltage at rate of 6 per second.
12 minutes after hyperventilation. Still higher voltage with diphasic discharges at rate of 8 per second.
16 minutes after hyperventilation. Discharges at a rate of 8-9 per second.
17 minutes after hyperventilation. Discharge frequency rate is 8-9 per second. Partial recovery to control recording.

FIGURE 3. Effect of voluntary hyperventilation on electromyography of gastrocnemius muscle.

Since muscle tonicity is an important factor in the general circulation, this factor may have more to do with circulatory failure than we have realized heretofore. Particularly may this be true when orthostatic hypotension and tachycardia are present.[15] Henderson suggested that circulatory failure in shock be designated "atonia" to designate the essential nature of the condition.

Blood pressure following hyperventilation does not always fall, although it may in certain instances. Compensation for lowered cardiac output which must ensue from hyperventilation is obtained in part by the intensive vasoconstriction which immediately follows. This is particularly well illustrated by the air plethysmographic record (Figure 4).

This finding also explains the coldness and numbness of the extremities which are part of the general symptomatology; possibly also the mental clouding, lack of coordination, loss of emotional control, and inability to concentrate, symptoms so often described by patients. According to Engel, Ferris, and Logan,[8] there is an early clouding of consciousness which is accompanied by a slowing in the frequency of the electrical discharges seen in the electroencephalogram. This is a constant finding and occurs early in experimental hyperventilation. It gives objective support to the oft repeated complaints of faintness, lightheadedness, blurring of vision, and loss of the sense of awareness.

Tetany is a late symptom and is rarely complained of in my experience. A satisfactory explanation for it has not been given, though it is often assumed that alkalosis, which is part of the condition, diminishes the amount of ionized calcium. Talbott, et al.,[9] and Shock and Hastings[6] have presented biochemical evidence that the tetany is related to the arterial carbon dioxide tension rather than to the *p*H (Figure 5).[11]

Anoxia of the central nervous system may well be the cause of both the cerebral depression and the muscle changes. This is probably produced by a combination of vasoconstriction and a marked inhibition of oxyhemoglobin dissociation known to result from lowered arterial carbon dioxide tension. Still another factor is general circulatory impairment from slowing venous return, the result of muscle hypotonia.

IN the attempt to get more evidence for or against Henderson's concept of impaired venous return, we have measured not only the intramuscular pressure before and after hyperventilation, but also the venous pressure, the

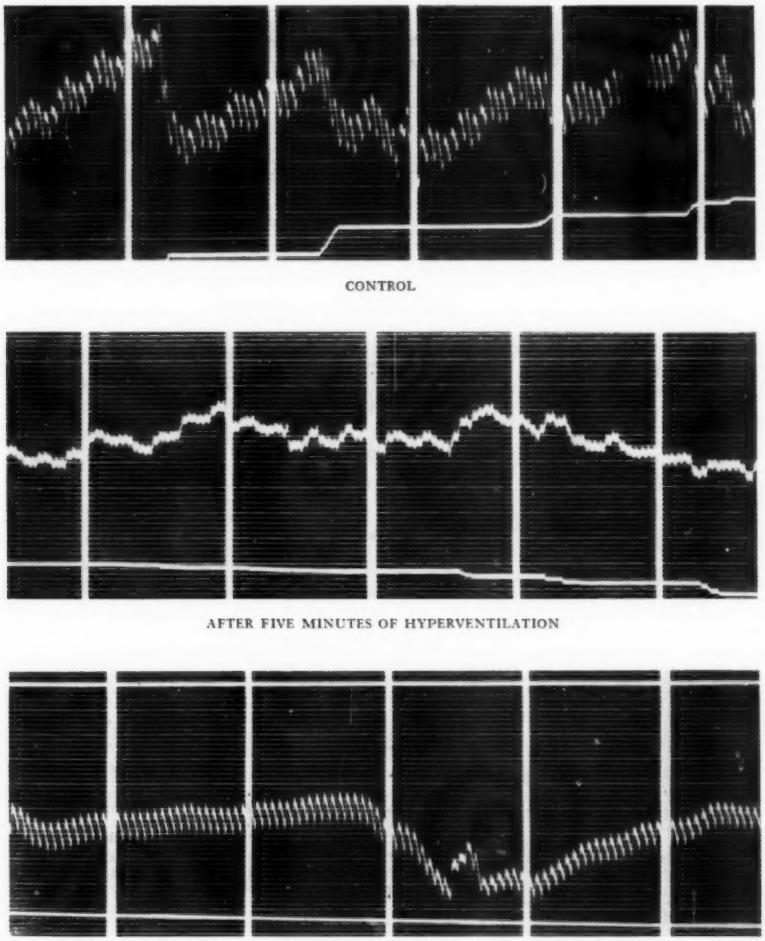

FIGURE 4. Plethysmographic record. The small waves represent cardiac pulsations. Note that they have almost disappeared after five minutes of hyperventilation but have returned twenty minutes later.

circulation time from foot to lung, and the effect of postural changes on pulse rate and blood pressure. Venous pressure was found to fall 20 per cent after three minutes of hyperventilation, and to remain at the same lower level after six minutes of overbreathing. Technical difficulties have rendered our venous circulation time tests somewhat uncertain, but a slowing during acapnia seems indicated.

Further studies are in progress to determine the effect of acapnia on muscle power and on muscle excitability to the stimulus of the galvanic current. In these studies we have the cooperation of Doctors Herman de Jong and A. A. Unger of the Department of Neuropsychiatry of the Birmingham General Hospital. Final conclusions cannot be drawn at this stage.

HYPERVENTILATION IN RELATION TO ORGANIC HEART DISEASE

Boyer and Bailey[18] demonstrated the practical value of the test for carbon dioxide in expired air when they showed that there was a direct correlation between the functional classification of heart disease and the partial pressure regardless of the type of heart disease present. In our preliminary studies we have been able to

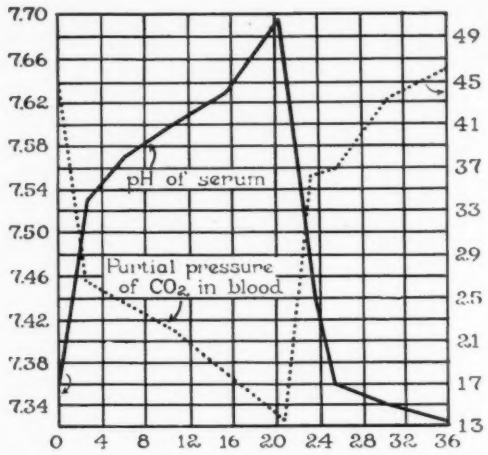

FIGURE 5. Reciprocal relationship of carbon dioxide and *p*H of blood and serum during hyperventilation. (From Carryer.[11])

confirm their findings. I believe this method will become of great value to the practicing physician for functional classification and for checking progress if and when a satisfactory method is developed for quick and accurate carbon dioxide determinations (Tables 1 and 2).

NEUROCIRCULATORY ASTHENIA

The controversy as to whether neurocirculatory asthenia ("effort syndrome," "disordered action of the heart," "soldier's heart," "cardiac neurosis") is identical with the hyperventilation syndrome is still not settled to the satisfaction of all. However, I would not know how to make a distinction between them since the findings in both are essentially the same. Cohen and White's careful studies[17] demonstrated that there is a definite hyperventilation in response to effort in cases of neurocirculatory asthenia, and the greater the effort the more marked the degree of hyperventilation. Soley and Shock[7] state flatly that these two conditions are one and the same, basing their opinion on painstaking biochemical studies.

ANESTHESIA AND HYPERVENTILATION

The anesthesiologist profoundly alters the body mechanics in all systems when he administers his drugs and gases. Many controls have been devised, and anesthesia no longer carries the profound hazards of former days. The recent loss of one of my younger patients referred for tonsillectomy makes me wonder if we have given sufficient consideration to the role of carbon dioxide in respiration. It was the old story of ether anesthesia, sudden failure of respiration, artificial respiration, death, autopsy, "status thymo-lymphaticus." In other words, cause of death unknown.

Henderson[4] insisted that these deaths were the result of acapnia, i.e., insufficient carbon dioxide to stimulate the respiratory center. Ether is notorious as a stimulant to respiration in the early stages of anesthesia. This reduces the store of carbon dioxide in the body and leads to apnea. Artificial respiration further reduces the carbon dioxide, but would be of value if carbon dioxide, possibly in 10 per cent concentration with oxygen, were inhaled at the same time. In the anesthetized state the long period of apnea which may follow hyperventilation (up to ten minutes if the lungs are filled with oxygen) can be sufficient to permit tissue asphyxiation and death. One anesthesiologist, with whom I have discussed this, tells me that they are generally timid about the use of carbon dioxide. I believe the lack of it is more to be feared. All of which goes to prove the necessity for a direct reading apparatus to give instantly the tension of carbon dioxide in the expired air.

TREATMENT OF PSYCHONEUROTIC HYPERVENTILATION

The early treatment of psychoneurotic hyperventilation should be aimed at the relief of the distressing symptoms from acapnia. Restoration of adequate carbon dioxide to the system gives prompt relief. Strength returns, the mind clears, and self-confidence is restored. Calcium intravenously also gives temporary relief in some cases, possibly by supplying the diffusible ion thought to be diminished during respiratory alkalosis. An increased blood *p*H is supposed to diminish the ionizable Ca^{++} fraction, though direct evidence on this point is not yet forthcoming. Ammonium chloride is often given to increase ionization but I question its value, especially in view of an already depleted bicarbonate content of the blood. Clinically I have seen little benefit from its use.

Carbon dioxide by inhalation can be used in the office or in the home. It is irritating to the

TABLE 1

VENTILATION IN PATIENTS WITH CARDIAC DISEASE GROUPED ACCORDING TO FUNCTIONAL CAPACITY

	Number of Subjects	CO_2 Tension of Expired Air		
		Mean Value, Mm. Hg.	Range, Mm. Hg.	Average Hyperpnea
Normal		20.00	22.50-18.00	
Class II	61	18.55	21.47-16.31	7.8%
Class III	45	15.81	17.56-14.01	26.5%
Class IV	32	13.44	16.06- 9.04	48.7%

From Boyer, P. K., and Bailey, C. V.[18]

TABLE 2

VENTILATION ACCORDING TO ETIOLOGIC TYPES IN COMPARABLE DEGREE OF FAILURE

Type of Heart Disease	Mean Tension of CO_2 in Expired Air*		
	Class II	Class III	Class IV
Hypertensive	19.15 (11)	16.06 (16)	14.26 (10)
Rheumatic	18.51 (33)	15.85 (10)	13.81 (11)
Arteriosclerotic	18.33 (15)	15.61 (16)	13.73 (5)

*Tension in millimeters of mercury; number of subjects in parentheses.

From Boyer, P. K., and Bailey, C. V.[18]

mucous membranes if given in high concentration. Probably the best means of administration would be in 10 to 15 per cent concentration with oxygen. The time honored paper bag for rebreathing also works well for immediate relief in many cases. Such measures not only alleviate symptoms, but have educational value, leading to voluntary control of respiration. In some cases, such as in that of the engineer, this may be sufficient for complete restoration. Education, in my opinion, is our most potent measure.

I HAVE often wished, however, for some drug which would depress the sensitivity of the respiratory center without effect on the higher centers and without depression of the mental faculties. The barbiturates are not ideal. Morphine is a powerful depressor of the center beyond all other opium derivatives, but habituation is too great a danger. It may well be that some of the sympatholytic and adrenolytic drugs will be the answer. I have obtained benefit from the use of ergotamine tartrate in certain instances, but its side effects limit its value. The newer drugs, such as the benzodioxane compounds of Fourneau, may eventually be of benefit.

The most promising compound to date appears to be Dibenamine.* A report of its use by Rockwell[19] of Cornell University for certain psychopathologic syndromes is most encouraging. He gave 250 mg. three times a day in enteric-coated tablets and felt that the drug broke a vicious cycle so that the patient could become a candidate for psychotherapy and more basic measures of rehabilitation.

Of course, the ultimate objective in all psychoneurotic states is to resolve the anxiety and smooth out the emotional pattern. This phase of treatment must be emphasized. But before this can be accomplished, relief of psychosomatic symptoms must be obtained.

TREATMENT OF HYPERVENTILATION ASSOCIATED WITH ORGANIC HEART DISEASE

Treatment of hyperventilation due to organic heart disease is, of course, the treatment of a failing heart. This is well standardized today and requires no comment here. Boyer and Bailey showed that hyperventilation, as evidenced by the partial pressure of carbon dioxide in the expired air, diminished as the circulatory function improved.[18]

*Prepared by Givaudan-Delawanna, Inc., Delawanna, New Jersey.

CONCLUSIONS

1. Emotional conflicts in many individuals lead to hyperventilation with literally terrifying symptoms such as faintness, weakness, collapse, and even a sense of impending death.

2. The basic cause of such symptoms is carbon dioxide depletion (acapnia) which leads to profound disturbances in physiology including an effect upon the central nervous system, the vasomotor system, the skeletal muscles, and the circulation.

3. There is a great need for a simple diagnostic procedure to diagnose and gauge the degree of hyperventilation.

4. The carbon dioxide partial pressure of expired air appears to be a very satisfactory method. To overcome the practical difficulties of gas analysis in the laboratory, the need for a direct reading instrument of great accuracy is obvious.

5. Adrenalin may be a sensitizer of the respiratory center to carbon dioxide and thus be a factor in hyperventilation.

6. A drug to depress the respiratory center would be a great aid in therapy. Dibenamine may prove to be that drug.

The author wishes to acknowledge with gratitude the cooperation of Dr. Robert D. Mitchell, medical resident at the Birmingham General Hospital, in these studies; also of Dr. N. W. Karr for valuable assistance.

From the Medical Service of the Birmingham General (VA) Hospital, Van Nuys, California.

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The Treatment of Glaucoma

THE SCHNEIDER FOUNDATION EYE PRESENTATION

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SEVERAL analogies may be drawn between glaucoma and vascular hypertension. Each is a persistent increase in pressure above the normal values, which admittedly have a wide physiologic range and are affected by numerous factors, psychologic as well as physical. Neither is a disease entity, but a symptom common to a number of diseases. Vascular hypertension may be secondary to such diverse conditions as adrenal tumors, basophilic adenomas of the pituitary, or primary disease of the kidney. Intraocular hypertension may be secondary to many different diseases of the uveal tract, to intraocular tumors, and occasionally to more generalized disturbances, such as epidemic dropsy, a disease seen in India, apparently due to the eating of polished rice which has been stored in damp heat.

In both vascular hypertension and intraocular hypertension, however, it is recognized that a group of cases may be set apart as constituting a definite disease entity, the etiology of which is at present not exactly known. These two disease entities are known by the somewhat vague terms "essential hypertension" in the case of raised blood pressure, and "chronic simple glaucoma" in the case of raised intraocular pressure. The definition of each is based on the fact that no known associated disease or abnormality is present which can be held responsible for the raised pressure. Essential hypertension has been defined as persistently elevated diastolic blood pressure of unknown origin without recognizable disturbance of renal excretory function. Chronic simple glaucoma is defined as persistent elevation of intraocular pressure without recognizable cause for the disturbance in the formation or elimination of aqueous humor.

The treatment of any disturbance in function should be based on a knowledge of its pathogenesis. Within the last ten years our knowledge of the pathogenesis of chronic simple glaucoma has been considerably increased by the refinement of a method for examining the site of the outlet of aqueous humor. The instrument designed for this purpose is known as the *gonioscope,* which allows one to explore the recess between the posterior surface of the cornea and the anterior surface of the iris where the two merge into one another. It is here that aqueous humor leaves the eye via the canal of Schlemm.

When cases of chronic simple glaucoma are examined by this instrument, it has been found possible to establish, at least as a working basis, the existence of two distinct types—one type in which there is obvious obstruction to the entrance of aqueous humor into the recess where it could drain out of the eye, and another group in which there is no such obstruction to the access of aqueous humor into this recess.

In the case of chronic simple glaucoma we

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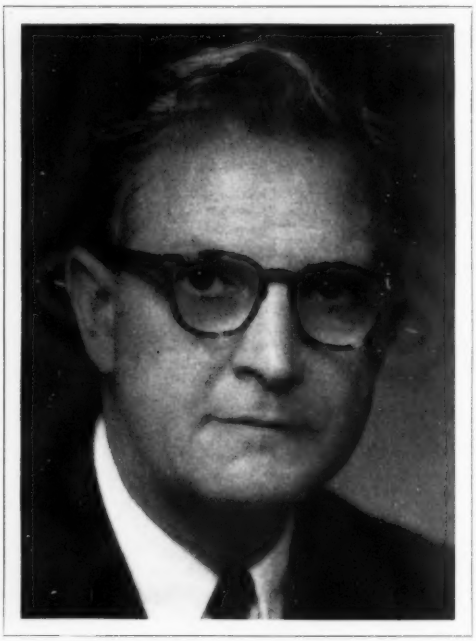


FRANCIS H. ADLER

now find ourselves, due to the employment of the gonioscope, in the position where the definition we have given above breaks down, for we know that the cause of the raised pressure in the narrow angle group is due to the inability of the aqueous humor to get into the recess whence it can escape into Schlemm's canal. This type of glaucoma has therefore been called "narrow angle glaucoma." Those cases in which the angle is wide open, so that there could not possibly be any hindrance to the entrance of aqueous humor into the recess are labeled "open angle glaucoma." Some other and as yet undetermined cause for the elevation of pressure must be found for this type of case. It has been assumed for the moment that the raised pressure in cases of open angle glaucoma is due either to obstruction to the passage of aqueous humor into Schlemm's canal because of changes in the pectinate ligament; to the presence of hyaline membranes covering this canal, or to a too rapid formation of aqueous humor, so that more is formed than can be eliminated in any one moment. As a result of this, a new high level of pressure is established.

I believe that the treatment of chronic simple glaucoma has been materially advanced by this concept of narrow angle and open angle types. We are now in a position to plan the treatment for a proved case of chronic simple glaucoma on a rational basis. Our first job is to recognize the type to which any given case of chronic simple glaucoma belongs. The two types generally present quite different clinical pictures, pursue different courses, and have a different prognosis and treatment.

NARROW ANGLE GLAUCOMA

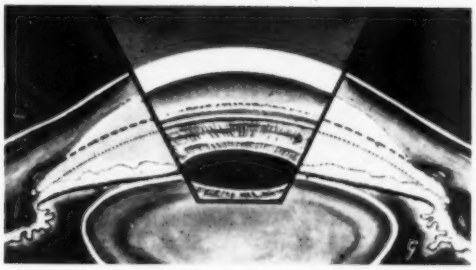
The narrow angle type is characterized by frequent episodes of increased pressure accompanied by symptoms of pain or blurring of vision. The attacks are frequently dependent on emotional disturbances and are probably due to the dilatation of the pupil which closes off the angle already embarrassed. Numerous mild, so-called "prodromal" attacks may be complained of, but sooner or later the individual so afflicted will have a fullblown acute attack of glaucoma, the severity depending naturally upon the degree of blockage. Between attacks, the pressure may be entirely normal. The optic disks show no cupping and visual fields are generally entirely normal until late in the disease. This is the type of case in which no sign of glaucoma may be present at one or even on several examinations, but on occasion the patient may show a rise of pressure. This is particularly true if the pupils are dilated, either by drugs or, as previously stated, by emotional upsets. If the embarrassment at the angle is marked, even physiologic changes in pupil size may determine rises and falls in pressure. If the case is examined with a gonioscope, the narrow angle gives the explanation for the sudden pressure changes.

Provocative tests may be employed to determine how greatly the angle is embarrassed. This is best done by artificially dilating the pupil with homatropine and taking repeated tonometric readings. If the pressure remains almost normal in spite of a widely dilated pupil, it is evident that there is little embarrassment to the entrance of aqueous humor into the angle and that the patient probably needs no treatment, but should be kept under observation. If, on the other hand, the provocative test succeeds in markedly elevating the pressure, the patient needs immediate treatment. Obviously the angle must be opened and kept open. I believe that this is best accomplished by surgery.

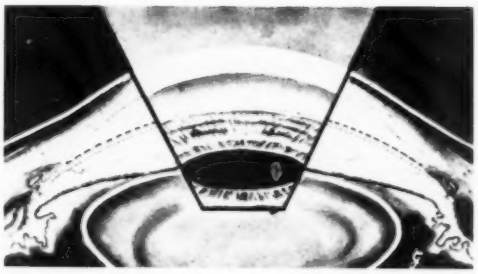
If the pressure can be normalized by miotics, both during and between attacks, the operation we prefer consists in removing a small portion of the peripheral part of the iris near its root so that the aqueous humor can gain access to the iris angle at all times even though the pupil dilates. In early cases, such a small peripheral iridotomy suffices. The operation is quite simple to perform and results in no disturbance in visual function. The great difficulty is in persuading patients to be operated on before they have had a serious acute attack.

During a serious acute attack, a complete basal iridectomy is the procedure of choice if the operation can be done within twenty-hour hours after the onset of the attack. If the acute attack has lasted more than twenty-four hours, or if the patient has had numerous subacute attacks and between these the pressure has remained high in spite of miotics, it is evident that the angle is sufficiently closed that a basal iridectomy will not succeed. In such cases, one of the iris inclusion operations is advised, such as an iridencleisis. If the patient has had an acute attack in one eye, surgery is always recommended in the other eye, as it is an almost invariable rule that patients with narrow angle glaucoma who have had an acute attack in one eye eventually have an acute attack in the other.

When miotics are to be used, the choice is Pilocarpine 1 per cent, one drop to be put in the eye on awakening, and another around dinner time. The object is to keep the pupil contracted, and as dilatation of the pupil usually takes place at times when the illumination is dim, the patient may be advised to place an extra drop in his eye if he goes to the theatre or moving pictures where the illumination is apt to be dim. If he awakens during the night and stays awake, a drop should be instilled. The pupil is normally contracted during sleep so that one does not have to consider using the drops at this time, but on awakening the pupil normally dilates. I should like to emphasize, however, that every case of narrow angle glaucoma is in danger of an acute attack until the embarrassment at the angle is relieved surgically.

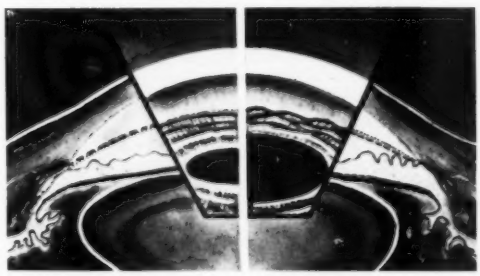


NORMAL (WIDE) ANGLE



NARROW ANGLE

PUPIL CONSTRICTED PUPIL DILATED



NARROW ANGLE

OPEN ANGLE GLAUCOMA

The group of cases which constitute the open angle type of chronic simple glaucoma generally have no symptoms until late in the disease. It is now generally conceded that the only way

these cases can be diagnosed in the very early stages is by routine measurements of the intraocular pressure. In one survey made here in Philadelphia by Mullen and his associates, a number of unsuspected cases of chronic simple glaucoma were discovered in the routine examination of employees voluntarily undergoing this test.

It should be the routine procedure in every ophthalmologist's office to measure the pressure on every patient past 45 years of age with a Schiotz standardized tonometer. In this way, the disease will be picked up before the stage of cupping and field loss which have generally been the criteria for its diagnosis. By the time the disk has become cupped as a result of the pressure and the fields show characteristic loss, the disease has caused irreparable damage.

Recently, a tonometer has been devised by Berens for use by the general practitioner as a screening instrument. It gives admittedly a gross estimate of the intraocular pressure, but its sponsors believe it will be more accurate than the estimation of the intraocular pressure by finger palpation of the globe and they consider that by its use early cases of glaucoma may be picked up. Undoubtedly a number of normal individuals will also be made suspect of glaucoma and whether in the long run the instrument will be found to be practical remains to be seen.

Recently efforts have been made in Pennsylvania to instruct the general practitioner in the diagnosis of glaucoma. Unless he is to be instructed in the use of a standardized Schiotz tonometer and in the taking and interpretation of visual fields, I cannot see how he is to make a diagnosis of the open angle type at a stage before the patient has some ocular damage. It is far better to acquaint the general physician with the fact that the diagnosis of this type in the early stages, which is the most valuable time to save sight, can only be made by an experienced ophthalmologist and to urge him to refer patients to such an individual for routine examination of intraocular pressure. The general practitioner should remember that the early stages of open angle glaucoma before field loss sets in are characterized by no signs or symptoms. The patient does not know he has the disease and only an experienced ophthalmologist can make the diagnosis.

Once the patient has been found to have the open angle type of chronic simple glaucoma, the treatment consists in adopting some measure for lowering the pressure to a satisfactory level. This is the level at which no field loss occurs. Just as the normal pressure differs among individuals, so the pressure which is safe for any patient with open angle glaucoma to carry varies among individuals suffering from the disease.

Every case of open angle glaucoma should have a conservative, prolonged test of control of the pressure with miotics. There is never any danger of an acute attack in a case of open angle chronic simple glaucoma, as there is in the narrow angle type. Unlike the narrow angle type, the pupil may be dilated with impunity and tests show that in these cases, even with wide dilatation, the increase in intraocular pressure is seldom more than a few millimeters of mercury.

The best provocative test for the open angle group is known as the "water test." The patient drinks a quart of water early in the morning, having had no food or fluid since the previous evening. The intraocular pressure is measured before the water is ingested and at fifteen-minute intervals thereafter for five determinations. Cases of chronic simple glaucoma of the open angle type show an increase in the intraocular pressure during this procedure, after which the pressure returns to normal.

It is our belief that no case of open angle glaucoma should be operated on if the pressure can be controlled by the use of miotics. Satisfactory control of pressure is indicated, not by the pressure readings alone, but as stated, chiefly by the visual fields. If these are maintained in spite of continued elevation in pressure, surgery is not advised.

The miotics employed are the same as for narrow angle glaucoma. Pilocarpine (1 to 4 per cent) is the miotic of choice. Other miotics which we employ routinely are Carcholin (1.5 per cent), Furmethide (10 per cent), Eserine (up to 1 per cent) and DFP (from .035 to .05 per cent). The objective is to maintain pressure at a nearly normal level throughout the whole twenty-hour hours. Accordingly, the patient is advised to instill the drops at such times as the pressure is apt to be elevated. The normal diurnal tension curve shows the greatest rise in pressure early in the morning, for reasons which are not as yet understood. Most patients are instructed to use from 1 to 4 drops daily, getting the greatest concentration in the eye so as to

keep the early morning pressure down. This is most easily accomplished by instilling a drop at dinner time, one at bed time, and one immediately on awakening in the morning.

Any patient may become sensitive to any one or all of these miotics. The pharmacodynamic action of miotics in open angle glaucoma is still unsolved, but there is no doubt as to their efficacy. They can hardly lower the pressure by opening the angle, as is the case in narrow angle glaucoma, for the angle is already open, permitting ready access of aqueous humor to the canal of Schlemm. Whether the action is in some way connected with the rate of formation of aqueous humor, or by hastening absorption through an as yet unknown mechanism, is a problem for the future to solve. New drugs are constantly being tested, one of the latest of which is Dibenamine. This drug has a sympatholytic action and may be effective by lessening the formation of aqueous humor, as experiments by some of our staff indicate.

When it is found that medical treatment of a case of open angle glaucoma is not stopping progressive field loss, surgery must be resorted to. Since this cannot be directed toward opening the iris angle, the procedures employed are those which establish new avenues of drainage of fluid from the eye. Most surgeons resort to one of the filtering types of operation, such as corneoscleral trephining, a modified Lagrange sclerectomy, or a cyclodialysis. All these operations create new pathways for the escape of aqueous from the eye and sidetrack the canal of Schlemm. The majority are effective and the disease can be controlled fairly well for long periods of time.

It has been found, however, that over a ten-year period many cases show progressive field loss in spite of normalization of pressure, and nearly all cases, if followed over a ten-year period, show advancing cataracts. The operation hastens the formation of cataract if it does not actually induce it. The visual acuity is never as satisfactory after one of the filtering types of operation, even though successful, and the presence of a bleb is frequently annoying to the patient.

We have come to realize that the outcome of surgery or of medical treatment of glaucoma is very difficult to assess because of failure in the past to follow up these patients over long periods of time. Most of the reports in the literature are based on analyses of cases followed for only one or two years. For this reason, numerous glaucoma clinics have sprung up over the country where the disease can be intensively studied and the results of different types of operation compared in terms of long-term effectiveness without the bias of any one surgeon's preference.

Whereas a few years ago immediate operation was frequently advised for every patient with chronic simple glaucoma, the cases belonging to the open angle group have now been found to do better under medical treatment, provided that this suffices in preventing field loss. As a result of the experience in the Glaucoma Clinic at the University Hospital, under Dr. Scheie's direction, we do not operate any case of open angle glaucoma until it has been demonstrated that medical treatment is no longer effective. On the other hand, narrow angle glaucoma is treated by early surgery.

The record for the treatment of chronic simple glaucoma has not been good in the past. This has largely been due to the fact that treatment was not based on a knowledge of the pathogenesis of the disease. There are still some who do not admit that two types of glaucoma—wide angle and narrow angle—exist, but the results of treatment based on dividing cases into these two groups following gonioscopy have been so much improved that the outlook is far brighter than it has ever been. It will continue to improve as we learn more about the disease. In order to accomplish this, fundamental research and the compilation of carefully kept statistics over long periods of time from our glaucoma clinics are essential.

Diagnosis and Treatment of Infantile Paralysis

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THIS paper has not been planned to cover all aspects of the diagnosis and treatment of poliomyelitis but rather to select a few important practical points. Under diagnosis, I propose to emphasize the difficulties from the viewpoint of the physician who first sees the patient, usually the family physician or pediatrician. Under treatment, I will confine my efforts to a discussion of the highly specialized type of physical therapy known as the Kenny treatment.

DIAGNOSIS

Because we have no specific test to verify the presence of poliomyelitis, the diagnosis may be very difficult, especially in the early stages. The first symptoms are usually one or more of the following: fever, malaise, headache, nausea, and vomiting. Except in unusually severe cases, there is no stiffness of the neck and back and no muscular pain. A positive diagnosis cannot be made at this time, since all these symptoms are compatible with a nonspecific upper respiratory infection.

When confronted with such a situation during a polio epidemic period, it behooves the physician to warn the parents that although there is no definite evidence of poliomyelitis, the patient must be watched for further possible developments. This can be done without unduly frightening the family by stating that the chances of polio's developing are rather slight. Fortunately most children with the above symptoms recover completely, either because they have a common upper respiratory infection or an extremely mild case of poliomyelitis. Several intensive virus investigations (finding the virus in the stools) have shown that these abortive types of poliomyelitis far outnumber the cases that can be diagnosed clinically.

However, if after several symptom-free days, the fever begins to rise again, we may have the second dromedary fever hump which is quite common in this disease. This is the so-called second stage of poliomyelitis. At this time, the symptoms present in the first stage return in a more severe form. The fever is higher and more sustained, the malaise more apparent, headache and vomiting usually more pronounced. Now definite symptoms of poliomyelitis may appear. The patient complains of pain in the back and neck, and frequently in one or more of the extremities. On examination, definite stiffness of the back is noted and there is obvious resistance when the examiner tries to bend the neck forward.

At this point a spinal puncture is indicated and if an increased number of cells is found, with or without high protein values, the diag-

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nosis of poliomyelitis is probable. The increased cell count in the spinal fluid is the best single sign of infantile paralysis but, of course, cannot be relied upon absolutely and must be judged in conjunction with other signs and symptoms. In the 10 to 15 per cent of polio cases where the cell count is not increased, bulbar symptoms or definite paralysis and muscular weakness can decide the issue.

If, in spite of all efforts, the diagnosis is still in doubt, the patient's best interests are served by treating him as a suspected case of poliomyelitis until a more exact diagnosis can be made. In such doubtful cases it must be emphasized that laboratory and x-ray examinations and careful clinical observation must continue until a definite diagnosis is made. Not infrequently patients are sent to the Kenny Institute, often from quite distant points, with a diagnosis of poliomyelitis without a preliminary cell count. Occasionally the true diagnosis turns out to be osteomyelitis, various forms of meningitis, encephalitis, Guillain-Barré syndrome, tetanus, mumps, or pneumonia. While an early negative spinal cell count would not necessarily have ruled out poliomyelitis, it would at least have encouraged further careful examination.

A majority of the patients do not develop further symptoms but a minority (and the percentage varies in different epidemics) go on to the third stage which is characterized by muscle weakness and muscle paralysis with or without the various forms of bulbar involvement. I have not deemed it within the scope of this paper to go into the minutiae of the diagnosis but wish only to emphasize a few of the more important practical points.

To recapitulate briefly on the diagnosis: during an epidemic of infantile paralysis, physicians must be polio conscious and evaluate critically cases which at other seasons of the year can be dismissed as simple upper respiratory infections.

TREATMENT

Once the diagnosis is made it is of the utmost importance to begin treatment without delay. I realize the value of supportive treatment in poliomyelitis (fluids, food, oxygen, plasma, etc.) and the much greater importance of the treatment of bulbar polio, but these have been described adequately in medical literature. Because very little of practical value has been offered to physicians about the Kenny treatment, I will confine my discussion to that method.

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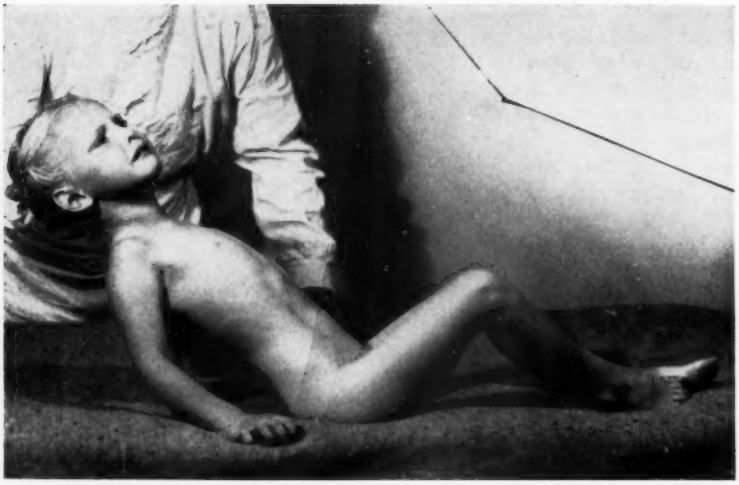
It is frequently said that the Kenny treatment is generally employed in this country; this would be true if the treatment consisted solely of the abandonment of splints and the haphazard application of hot packs. It cannot be repeated too often that properly-applied hot foments, while an important part of the treatment, are definitely of secondary value when compared with the re-training of the muscles. Treatment of all cases in a hospital is advisable; even the mildest forms may suddenly develop bulbar symptoms and require emergency care.

The first step, after the patient is admitted, is to place him in a properly prepared bed. Ideally the bed should have no springs, but a solid board bottom, head, and foot. Because of the difficulty in obtaining such a bed, a 1½- to 1¾-inch plywood board is placed between the springs and the firm cotton mattress. This board should rest on the metal cross bars at the head and foot of the springs. A foot board is separated from the mattress by two 4-inch blocks.



So-called spasm or muscle tightness.

Between the spring and the foot board there should be enough space for the patient's toes when he is in the prone position.

As soon as the calf muscles are loose enough to allow 90 degrees dorsiflexion, the patient's feet should be placed against the foot board to stimulate the standing reflexes. Immediately under and over the patient are wool blankets. Wool is used because it prevents chilling between packs, absorbs perspiration, and seems to prevent skin irritations. When sheet or cotton blankets are used the patient is apt to complain of muscle cramps. A cotton draw sheet is used under the head only. The top covers should never be tucked in but should be draped over the foot board.

Before discussing further steps of the treatment, a definition of terms is in order.

Spasm is the term used to describe the highly irritable and painful shortening of muscles, fascia, and subcutaneous tissues. These tight muscles may occur in any part of the body but are most commonly present in the areas of heavy fascia, such as the posterior neck, back (especially the lumbar areas), hamstrings, and the fascia lata. They cannot be relaxed voluntarily nor forcibly lengthened without causing severe pain and increasing the shortening. Spasm definitely is not limited to the antagonists of paralyzed muscles as is frequently stated. A normally contracting muscle will increase in diameter but one affected by poliomyelitis is flattened and narrowed as well as shortened. The shortened muscle will pull the body into the position produced by a normal contraction but will not allow the part to return to normal alignment. Unrelieved muscle shortening is an important factor in the production of deformity. In the early stages this shortening may be treated successfully, but if not corrected it may become a fibrous tissue contracture.

The exact cause of spasm or shortening is as yet unknown. It is possible that the virus attacks the muscles directly. There is clinical evidence to support the thesis that the poliomyelitis virus is not purely neurotropic but may invade the viscera and peripheral tissues. Recent studies showing that the heart is frequently damaged in poliomyelitis support this theory. Virus studies in animals add further confirmation, but the final answer has yet to be determined.

Incoordination is important in poliomyelitis. Patients frequently use wrong muscles or parts of muscles in attempting to carry out activity or may substitute stronger muscles for weaker ones. Coordinate rhythmic function is emphasized in the treatment because coordination is actually more important than strength in the performance of daily activities.

Motor denervation is an irreversible paralysis due to anterior horn cell destruction and, of course, is not alleviated by the Kenny or any other method of treatment.

The actual treatment has for its object the

Complete hot packs.

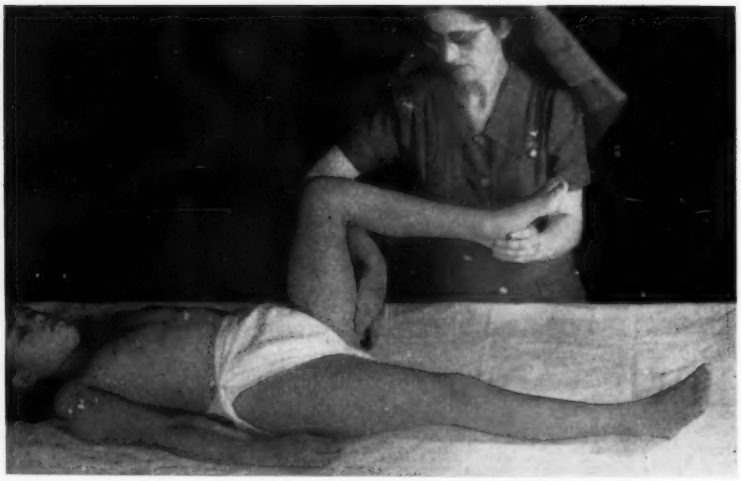
release of abnormal shortening, and the establishment of a pattern of movement which is normal or as near normal as possible.

Hot packs are applied for the release of the shortening and the relief of pain. These packs consist of three layers. The inmost layer is made of a knitted material, 75 per cent wool and 25 per cent cotton. It is cut in lengths ranging from one-half to one yard. The material must be soft and lightweight, so that it can be wrapped lightly and smoothly about the area. These inner packs are boiled in plain water and wrung out by a centrifugal extractor, such as those used in laundries or by a clothes wringer, and taken immediately to the bedside for application. These packs are applied at approximately 140° to 160° F., so care must be taken that there are no droplets of water in the packs and that all moisture is wiped from the skin before application of the pack in order to prevent burning.

The middle layer consists of a waterproof material, cut slightly larger than the area to be covered; it is cut in a triangular shape for the neck, shoulders, and thighs, and rectangular for the rest of the body.

The outermost layer consists of a dry covering of 100 per cent wool material, cut in shape and size approximately like the middle layer. It is the intense heat on application which makes the patient squirm a little and the gradual cooling that seems most effective. No effort is made to keep the packs hot after application. These packs should extend only over the areas between the joints with the exception of the ball and socket joints (the hip and shoulder, because they are covered by muscles).

The packs are applied every hour for twelve hours during the period of isolation and every one and one-half hours in the convalescent stage for a period of eight hours. They may be applied oftener if there is severe pain, or respiratory difficulty due to tightness of the chest muscles. Prone packs are applied without wrapping for a one-hour period twice daily. The hot packs are used to alleviate pain and to relieve muscle shortening. However, in order to overcome shortening, the packs must be accompanied by either active or passive movements, through as great a range as is possible without causing too severe pain to the patient.



Muscle re-education.

THE application of hot foments is accompanied by a skilled system of joint movements to re-educate nerve pathways. This phase of the treatment is divided into three distinct parts, each directed to a particular portion of the central nervous system. The first step is *tendon stimulation* of nonfunctioning muscles. The muscles and joints are moved through a short range in an effort to establish a reflex movement. This is done four times daily.

The second step is an attempt to establish mental awareness by *passive movements*. After the tendon stimulation, the technician explains to the patient the movement which she is going to perform and indicates to him the insertion of the muscle responsible for it. For example, if the wrist flexors are to be exercised, the technician tells the patient that she is going to bend his wrist and indicates the flexors carpi radialis and ulnaris and palmaris longus and the patient is told to "think" of the action while the technician does it. During the early stages of treatment this is done three times during the daily exercise period. This phase is an attempt to re-educate the afferent pathways.

As soon as the patient seems aware of the part or when some motion is noted, active assistive movements are begun. After the patient has been instructed during two passive movements he is told to "pull" from the insertion of the muscle. As coordination and strength improve, the number of active movements is increased and the number of passive movements is decreased. This phase is an attempt to re-educate the efferent pathways. Resistance exercises are not given until the patient has a fair amount of strength and coordination is good, again because coordination is much more important than strength. The patient is encouraged to sit and stand early if it does not increase the tightness or pain and if he can do so with fairly good posture. This portion of the treatment is used particularly to overcome incoordination and muscle weakness.

In the Kenny Institute, the supervision of hot packing and the actual manipulation of the muscles are carried out by Kenny technicians under the direction of the medical staff. In the past, these technicians have been graduate nurses, but from now on they will be graduated as physical therapists, with training made available to both registered nurses and physical therapists. Physical therapists will be given one and one-half years of training in the Kenny technic. Graduate nurses who are students in the present and future classes will receive, in addition, a year of physical therapy training. This training schedule is supervised and directed at Elizabeth Kenny Institute by Dr. Miland Knapp, Chief of Physical Medicine in the Kenny Institute and Clinical Professor of Physical Medicine in the University of Minnesota Medical School.

After graduation from a physical therapy course the student has three months of purely didactic work in anatomy with special emphasis on the origin, insertion, and function of muscles; neurology, pediatrics, psychology, com-

municable diseases, orthopedics, and physiology. Thereafter for fifteen more months she has a sort of an internship, when she treats patients under the very close supervision of the chief technician, interspersed with conferences, round table discussions, and individual instruction.

The treatment outlined above is carried out in all of the four Minneapolis hospitals that treat poliomyelitis patients; namely the University of Minnesota Hospital, the Minneapolis General (municipal) Hospital, Sheltering Arms (a private hospital exclusively for polio patients), and the Kenny Institute. The medical staffs in charge of poliomyelitis are virtually the same in all four institutions, and the physical therapists are all trained in the Kenny technic. This makes for teamwork during an epidemic and permits interchange of patients.

For the past fifteen months, the medical staff of the Kenny Institute has had complete direction of all medical activities, and now consists of a chief-of-staff, three physiatrists or specialists in physical medicine, two pediatricians, one internist, two consulting orthopedists, and one visiting orthopedist. A pediatric resident and a pediatric intern from the University Hospital rotate through the Kenny Institute as part of their university training. The medical treatment of poliomyelitis must, by its nature, be a matter of teamwork between pediatrician, internist, physiatrist, and orthopedist with other medical specialists called in when needed. Sister Elizabeth Kenny retains connection with the Institute as consultant and advisor in the teaching of the technic which bears her name.

An efficient outpatient department is a *sine qua non* in the treatment of poliomyelitis. Mild cases can often be discharged from the hospital early, and receive home treatment, provided that they report frequently and regularly for outpatient checkups.

In the past, overoptimistic reports on the results of the Kenny treatment have been given wide circulation. This has tended to make the medical profession cautious in judging the value of the work. The medical staff is now supervising the collection of data on all the cases treated in the Kenny Institute from 1940 to 1946 inclusive. We hope to complete the work in the near future and publish it in a medical journal. This study will give a reliable, objective report on the final results of Kenny treatment and should go a long way in convincing the physicians that they have been overlooking something of tremendous value to their patients. The medical staff of the Kenny Institute has as its primary goal the spreading of information about the treatment through the medical profession rather than through propaganda to the laity.

Muscle re-education.

The role of the orthopedist in the treatment of poliomyelitis calls for special consideration. In the Kenny Institute the orthopedist is an integral part of the team from the beginning and as a rule takes over when physical therapy no longer shows progress. When any difference of opinion arises between the physician and the orthopedist, a case conference is called and the case is discussed by the entire staff, after which a reasonable meeting of minds usually results.

Any concluding remarks I might make could not improve upon a statement made several years ago by Dr. Wallace Cole, Professor and Head of the Department of Orthopedics at the University of Minnesota: "The Kenny method keeps deformities to a minimum, utilizes to the maximum the remaining muscle power and almost eliminates curvature of the spine which sometimes follows apparent recovery."

I am indebted to Dr. Miland E. Knapp and Miss Vivian Hannan for assistance in describing the technical treatment.

Diseases of the Upper Gastrointestinal Tract

CORRELATION OF CLINICAL AND RADIOLOGIC FINDINGS

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CLINICIANS and radiologists are aware that it is to their mutual advantage to correlate symptoms elicited from historical data with physical findings and the information learned from a radiologic study in order to achieve logical diagnoses.

No field emphasizes the need for this correlation more than that of gastroenterology. This is particularly true of the upper gastrointestinal tract. Let us explore it together.

Patients first present themselves to you, the general practitioner, with many and variegated symptoms. Sometimes they are of a classical nature and at other times vague, jumbled, and confusing. Many unorthodox complaints suggest that their origin is functional, but with the wisdom of experience you also realize that their causes may arise in structural change.

Thus, similar subjective symptoms may be due to the presence of a hiatal hernia, an esophageal diverticulum, cardiospasm, peptic ulcers, cholecystitis, pancreatitis, or even neoplastic change.

Let us begin our study with a series of diverse patient-complaints, of which heartburn is the predominant one.

The heartburn begins after meals and is located behind the sternum. Slight epigastric pain, belching, or moderate distress is present. Regurgitation of food or a sour taste in the mouth is mentioned. There is no history of weight loss, vomiting, or bleeding. This type of history suggests that the following important lesions be excluded: hiatal hernia, esophageal diverticulum, cholecystitis, and peptic ulcer. Often your radiologist will confirm your suspicions.

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ESOPHAGUS

There will be a group of patients whose subjective symptoms will be entirely related to the passage of liquids and solids through the esophagus. The similarity of the symptoms is not so remarkable when you consider the structure of the organ and its function. Their time of appearance, severity, and duration will vary. Among them will be dysphagia, slight or pronounced; pain, early or late, located in the substernal or xiphoid area; belching; regurgitation of food; cough; bleeding and loss of weight, slight or marked.

Many of these subjective symptoms are associated in varying combinations and radiologic exploration reveals one of the following causes: esophageal diverticulum, esophagitis, cardiospasm or achalasia, hiatal hernia with or without ulceration, or early esophageal carcinoma.

Varices rarely give symptoms and, if present, bleeding is the predominant one. As you know, varices are associated with hepatic cirrhosis. The symptom complex varies with the duration of the lesion. (Figure 1.)

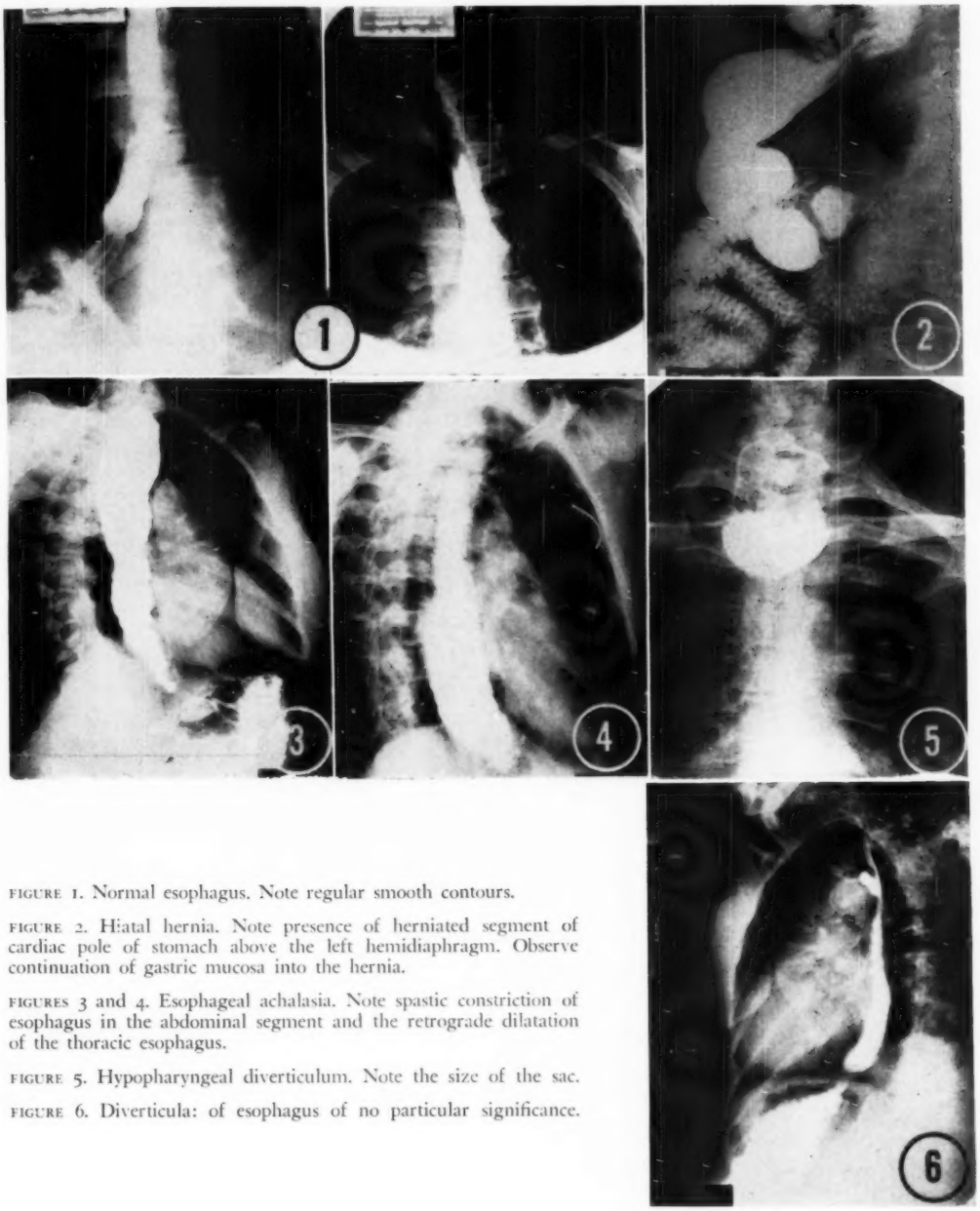


FIGURE 1. Normal esophagus. Note regular smooth contours.

FIGURE 2. Hiatal hernia. Note presence of herniated segment of cardiac pole of stomach above the left hemidiaphragm. Observe continuation of gastric mucosa into the hernia.

FIGURES 3 and 4. Esophageal achalasia. Note spastic constriction of esophagus in the abdominal segment and the retrograde dilatation of the thoracic esophagus.

FIGURE 5. Hypopharyngeal diverticulum. Note the size of the sac.

FIGURE 6. Diverticula: of esophagus of no particular significance.

HIATAL HERNIA

Patients in whom hiatal hernia is suspected will tell you they have a pain relating to the xiphoid or lower half of the sternal area, and that on swallowing they experience the sensation of a lump or ball in the throat. They will mention the regurgitation of and sometimes the vomiting of food. Dysphagia will be mentioned and often the radiation of pain mimics that observed in an anginal syndrome, or if pain

LEON SOLIS-COHEN

recurs in a cyclic manner, it seems to resemble the type of pain observed in the presence of gallstones or peptic ulcer. (Figure 2.)

CARDIOSPASM

In speaking of cardiospasm or achalasia, many of you will rightly suspect its presence from a trend of symptoms which suggests possible angina pectoris, particularly in those cases where substernal pain is pronounced and pallor and sweating accompany the attack. Of course, these symptoms are unrelieved by nitroglycerin. (Figures 3 and 4.)

Usually a mild case will give a history of an emotional upset, and present vague pain in the substernal or xiphoid region. This will be accompanied by dysphagia and a burning, sticking, or full sensation. Regurgitation and attempting to force food into the stomach occur at a later period.

DIVERTICULA

When a patient presents himself to you with a long history of throat irritation, dysphagia, a sensation of sticking of food or a foreign body, a slight cough, and a slight regurgitation, you at once think of a hypopharyngeal pouch or diverticulum, and roentgenologic examination often confirms your suspicions. (Figure 5.)

Other diverticula, such as the traction or pulsion esophageal type, rarely give symptoms and are discovered on examination of the chest or gastrointestinal tract when other lesions are suspected. (Figure 6.)

ESOPHAGITIS

A diagnosis of esophagitis to account for substernal pain which occurs immediately after swallowing should be made only if other esophageal lesions are excluded by means of endoscopy and x-ray examination. Hypertrophied folds and distortion, with beading of the esophageal mucosa, are observed with tortuosity and serration of the esophageal perimeters. Advanced cases show stenosis.

VARICES

Varices found during roentgenologic examination are usually discovered accidentally, and when present may produce symptoms suggesting mild esophagitis, or even give rise to sudden bleeding. They usually accompany hepatic cirrhosis. (Figure 7.)

An x-ray reveals that the mucosa in the lower part of the esophagus appears moth-eaten, wormy, and jagged; or a lacework pattern may be demonstrable.

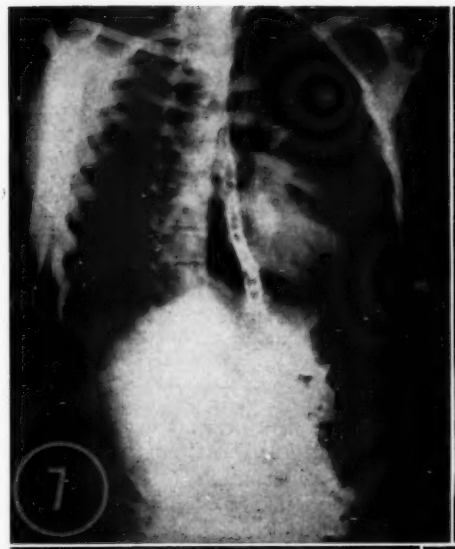
GASTRITIS

There is still another group of patients who will present themselves to you with various symptoms of epigastric distress, nausea, mild pain, occasional vomiting, and a long history of indigestion. In your mind these subjective symptoms fail to fit any clinical entity, and so you order an x-ray study.

Your radiologist is apt to report herniation of the gastric mucosa into the base of the duodenal cap; hypertrophic gastritis; or hypertrophic pyloric stenosis, as a structural change giving rise to the patient's symptoms.

The following is a typical case history in which herniation of the gastric *mucosa* into the base of the duodenal cap was noted by the radiologist: (Figure 8.)

For ten years a white male had suffered from



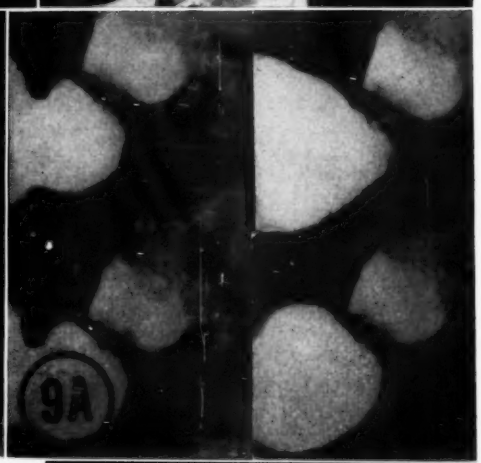


FIGURE 7. Esophageal varices. Note moth-eaten wormy appearance of esophageal mucosa.

FIGURE 8. Herniated gastric mucosa. Note the base of duodenal bulb is scalloped out to receive the intact gastric mucosa. The pylorus is smooth.

FIGURE 9. Hypertrophic gastritis. Note thickened elongated pyloric channel with prominent gastric folds.

FIGURE 10. Large penetrating gastric ulcer. Note it is extraluminal.

epigastric distress, nausea, and occasional vomiting. There was no weight loss or bleeding. The distress was relieved by eating small amounts of food and by taking bicarbonate of soda. The suspected clinical diagnosis was peptic ulcer. The radiologist observed a mushroom appearance to the base of the duodenal cap, where the gastric mucosa herniated into it. The mucosal folds passed intact through the pylorus into the cap. When these folds pile up within the base of the cap, symptoms are likely to be present and many clinicians accept these structural changes as the causative factor of subjective symptoms. In this condition there is no gastric residue; there is no displacement of the pyloric canal and the gastric peristalsis is natural.

When the radiologist reported benign hypertrophic gastritis as a result of his study, a case history elicited the fact that epigastric pain and distress had increased in severity over a period of five years. The pain was more intense at night. Vomiting had occurred every so often, in the past six weeks particularly, after indulging in a hearty meal. The patient was losing weight.

The suspected clinical diagnosis was gastric malignancy. Upon x-ray examination the stomach was observed to be slightly increased in size and there was a diffuse increase in the intensity of the mucosal markings or folds. Translucent areas were observed among the mucosal folds in the prepyloric gastric segment, and these folds were heightened and distorted. These folds are often termed giant rugae. The lesser curvature was somewhat jagged, but uninfiltrated. There was no herniation of the gastric mucosa into the base of the duodenal cap, and yet there was a striking similarity of symptoms.

Pyloric muscular hypertrophy in adults also gives rise to similar subjective symptoms, but radiologically the pyloric channel may have an eccentric axis; a concavity at the base of the duodenal cap may receive herniated muscle tissue, but gastric rugae cannot be traced from the stomach into the cap, through a narrowed and elongated pyloric channel. (Figure 9 and Figure 9a.)

PEPTIC ULCER

If your patient presents the classical rhythmic cycle of "food, comfort, pain" or of "food, comfort, pain, comfort," it is the strongest clinical evidence that he or she is harboring a gastric or duodenal ulcer. (Figure 10.)

But this cycle is not always present. The pain may be nonrhythmic, inconstant, unsteady, or remissive and located anywhere between the umbilicus and the xiphoid. Dyspepsia, nausea and vomiting, and constitutional symptoms may likewise be present in varying degrees of severity. Melena and weight loss may be present or absent. In order that the patient may be properly studied, among other procedures, you refer him for a searching x-ray study.

The barium-filled crater niche is the only positive sign upon which a diagnosis can be based with certainty. The existence of a peptic ulcer does not explain the pain mechanism, but indicates only that the gastric mucosa has ulcerated. If the serosa is involved, then, because it contains sensory nerve endings, pain would be explainable, or if perforation has occurred and

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FIGURE 11. Multiple gastric ulcers. Note two penetrating bulbs on lesser curvature. Irregular duodenal bulb also site of an ulcer.

FIGURE 12. Same case as Figure 11, arrested or in healing phase. Note diminution in size of ulcer. Clinical symptoms subsiding.

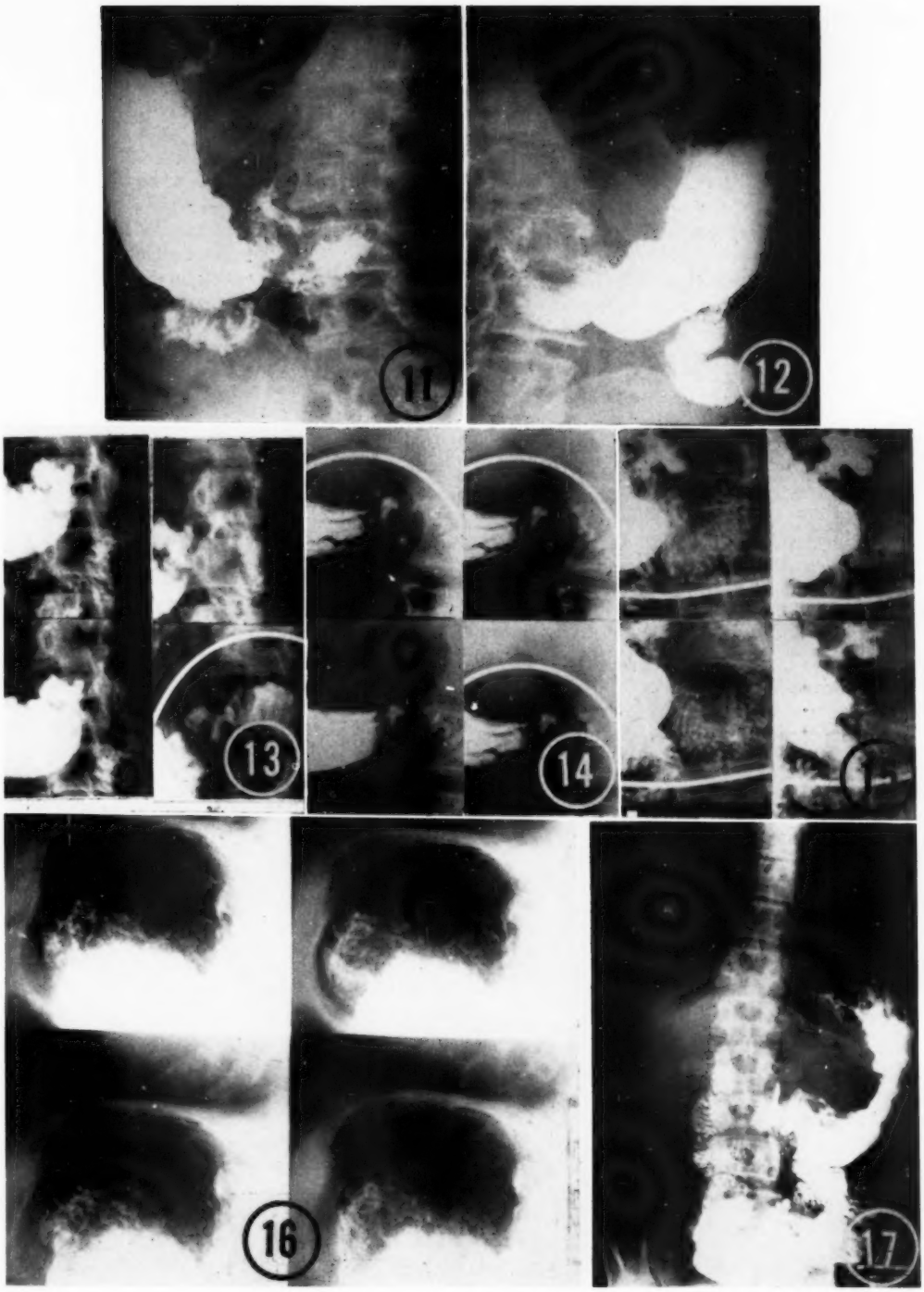
FIGURE 13. Peptic ulcer. Duodenum active. Note irregular cap in both filling and emptying phase. Disturbed duodenal mucosa.

FIGURE 14. Recurrent duodenal ulcer. Irregular spastic cap with crater and scarred mucosa.

FIGURE 15. Prestenotic duodenal ulcer. Note stenosing constriction of bulb. This type produces obstruction.

FIGURE 16. Gastric carcinoma cardiac pole. Note protruding soft tissue shadow into lumen of cardia and cast into relief by the magenblase.

FIGURE 17. Ulcerating carcinoma. Note intraluminal ulceration and deformity of entire stomach. (Comment: The first case—Figure 16—if diagnosed early would give some chance of salvage. The second case—Figure 17—none.)



(Legends opposite page)

the ulcer is adherent to the liver or pancreas, or has been walled off, this too will account for deep-seated tenderness and pain. (Figures 11 and 12.)

In profile the niche appears as a bud-like projection from the wall of the stomach. When viewed face on, the gastric rugae are observed converging to a round dense spot in the barium-filled stomach.

Perhaps the spastic incisura is the second most reliable finding. This must be unerasable and permanent and present on repeated examinations. It is situated on the curvature opposite the ulcer, and is due to the contraction of the circular muscle fibers in the involved gastric segment. It may be present when a niche is undemonstrable. Secondary roentgenologic evidence of ulcer includes accentuation of the gastric mucosal folds, localized tenderness at the site of the ulcer, active peristalsis, and gastrospasm.

In uncomplicated gastric ulcer, when the radiologist observes evidence of gastric spasm and irritability, he can be pretty sure that clinically gastric hypersecretion and possibly hyperacidity are present. When the ulcer is situated at or close to the pylorus, and has been resident and active for a fairly long time, it will produce narrowing of the pyloric channel through fibrosis and scarring of the regional gastric walls. As a result of this structural change gastrectasis occurs and gastric residues result from delay in the emptying time of the stomach. If the ulcer edges are ragged, then a blood vessel may have been eroded or minute penetration has occurred.

The size and site of the ulcer are not dependable criteria on which to base a diagnosis of malignancy. Ulcers situated within 1 to 2 cm. of the pylorus or on the greater curvature of the stomach are usually malignant.

Malignant ulcers elsewhere present demonstrable elevation and undermining if their borders are situated within the normal line of the gastric lumen; adjacent rugae reveal erasure and fading; there is increasing rigidity and lack of flexibility of the involved gastric walls, and if the meniscus sign is present it is diagnostic.

Patients in whom duodenal ulcers are suspected usually will relate the following type of history:

There is pain of varying intensity and inconstancy located between the umbilicus and the xiphoid. It may radiate to the back. It is always sharper or heightened when the duodenal serosa is involved.

The rhythmic cycle of "food, comfort, pain" is present. If the duodenal ulcer is giving rise to subjective symptoms for the first time, then nausea and vomiting are uncommon.

However, regurgitation and hunger sensations are more or less complained of. Vomiting is a late symptom and usually may be indicative of the prestenotic or stenotic type of ulceration. The patient often tells you that the stool is darker or occult blood may be detected in the stool by appropriate tests. (Figures 13-15.)

As a result of clinical and roentgenologic research it is now believed that in uncomplicated duodenal ulcers the pain is due to sustained contraction of the duodenal cap. The hunger sensations are definitely related to the fullness or emptiness of the stomach, in other words to gastric motility, increasing as the stomach empties.

The radiologic diagnosis of duodenal ulcer is based upon these findings:

1. An ulcer niche, usually about 3 cm. distal to the pyloric canal, situated on the anterior or posterior wall of the bulb in 95 per cent of the cases. In the other 5 per cent the location is between this site and the ampulla of Vater. Compression films will demonstrate the ulcer niche if others fail to do so.

2. Stenosis and contraction of the bulbar walls.

3. Spasm and irritability of the duodenal cap.

4. An eccentric pylorus.

5. The presence of a barium fleck within the ulcer crater.

6. Prestenotic diverticula, due to pinching and contraction of the cap.

7. Swelling displacement and exaggeration of the mucosal folds.

8. Deformity of the bulb.

9. A fluid level within the cap with a superimposed air bubble is noted when the patient is filmed in the erect posture.

ESOPHAGEAL AND GASTRIC CARCINOMA

Lastly we come to a gastric carcinoma. A patient is apt to give a history of intermittent sensations of food sticking in the throat, an uneasy swallowing act, vague crampy neck sensations, and a lump in the throat which comes and goes. These are the prodromal symptoms of dysphagia. In such cases you must immediately

think of a lower or upper esophageal or intragastric neoplastic change. Often your keenness will be rewarded when the radiologist likewise discovers an early lesion. If anything can be done for your patient, that is the time. (Figures 16 and 17.)

When the patient presents pain, pallor, anemia, signs of obstruction, hoarseness and change of voice, blood spitting and cough, then the hour is too late for any help medical science can afford. Palliative help is only comforting. A profession alerted to the recognition of the early symptoms of malignancy, anywhere in the body economy, will do much to soften the scourge of this killer. Eternal vigilance must be our watchword.

Roentgenologically speaking, any subtractional luminal defect, any intragastric luminal defect, any stiffening of large segments of the gastric walls, when associated with erasure of gastric folds and distortion of distant folds with narrowing of the gastric lumen, must be indicted as malignant until proved otherwise.

To stress again the early symptoms: prolonged epigastric discomfort; the prodromes of dysphagia; a diminution of appetite; constant dyspepsia; a growing dislike for food. Nausea and anorexia, when present, are later symptoms.

To repeat the x-ray findings: (1) persistent irregular filling defect subtracting from the contours of the stomach; (2) absence of peristalsis in the involved gastric segment; (3) rigidity of the gastric walls; (4) luminal narrowing; (5) demonstrable erasure and distortion of the mucosal folds; (6) fingerprint translucencies indicating intraluminal infiltration and invasion; (7) disturbances of normal motility and gastrectasis.

In conclusion, it is my firm belief that facts elicited from careful and exhaustive clinical histories, correlated with those obtained from laboratory studies and integrated with the findings resulting from a thorough radiologic exploration constitute the best type of service we can render the patient. From this critical analysis we will arrive at the greatest accuracy in diagnosis, from which all therapeutic management must stem, and be properly channeled.

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Claude Bernard (French physiologist, 1813-1878) in his laboratory. Important research on indigestion.

The Alcoholic of Today... A Sick Person

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Alcoholism today is America's unrecognized No. 1 emotional health illness. It destructively affects the individual, the family unit, and society.

This serious illness is, moreover, and with increasing frequency, causing accidental death, suicide, homicide, and manslaughter in all age groups. See your daily newspaper.

Statistics report approximately 800,000 known seriously sick alcoholics in this country, and about 3,000,000 heavy "social" drinkers, or incipient alcoholics. But these are minimum statistics, based on hospital and police records. The actual figures are undoubtedly much higher.

The alcoholic is a very sick person—sick in his thinking and behavior. He is unpredictable and mood-driven.

He is also handled by alcohol to such an extent that his drinking interferes with his life and with his important activities.

Alcoholism is a symptom of some—usually deep-seated—disturbance. It is like the tip of an iceberg. It may be symptomatic of any major or minor psychiatric reaction type. A large number of alcoholics, however, present no marked psychopathology; rather, they fall into a borderline group characterized chiefly by a "weak ego." One might say that these individuals have "cancer of the ego" and that, as with all cancers, early recognition and proper treatment is of the utmost importance.

Starting out on the premise that the ego is the core of human personality, one finds that these "weago" (weak ego) individuals lack or have not adequately developed one or more of the four essentials that are found in a strong and healthy ego, and which result in purposive and efficient conduct and living. (One must also remember that much of the content of the ego lies in the field of the unawareness.)

The four ego characteristics which this type of alcoholic lacks, to a great extent, or does not possess, are:

(1) *Independence* (self-government).

(2) *Freedom* (to think and act at a mature level).

(3) *Power* (to manage situations and take responsibilities).

(4) *Prestige* (assurance and feelings of adequacy).

In working with such a patient, we feel that, if his brain is still intact, it is possible for him to learn to understand the origin, the nature, and needs of expression of the ego weakness which lies behind his alcoholism.

But in addition to understanding himself better, the patient should be educated, and re-educated, about his personality and alcohol problem by daily active use of the following guides:

1. He must be convinced *from his own experience* that his reaction to alcohol is so abnormal that any indulgence for him constitutes a totally undesirable and impossible way of life.
2. He must be completely sincere in his desire to stop drinking once and for all.
3. He must recognize that the problem of drinking for him is not merely a problem of dissipation, but of a dangerous psychopathologic reaction to a (for him) pernicious drug.
4. He must clearly understand that once a man has passed from normal to abnormal drinking,

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he can *never* learn to control drinking again.

5. He must come to understand that he has been trying to substitute alcoholic fantasy for real achievement in life, and that his effort has been hopeless and absurd.
6. He must recognize that giving up alcohol is his own personal problem, which *primarily* concerns himself alone.
7. He must be convinced that at all times and under all conditions alcohol produces for him, not happiness, but unhappiness.
8. He must come to understand that the motive behind his drinking has been some form of self-expression, some desire to gratify an immature craving for attention, or to escape from unpleasant reality in order to get rid of disagreeable states of mind.
9. He must understand alcoholic ancestry is an *excuse,* not a reason for abnormal drinking.
10. He must realize that any reasonably intelligent and sincere person, who is willing to make a sustained effort for a sufficient period of time, is capable of learning to live without alcohol.
11. He must fully resolve to tell the truth and the whole truth, without waiting to be asked, to the person who is trying to help him—and must be equally honest with himself.
12. He must avoid the small glass of wine—i.e., the *apparently* harmless lapse—with more determination than the obvious slug of gin.
13. He must never be so foolish as to try to persuade himself that he can drink *beer.*
14. He must never be so childish as to offer temporary boredom as an excuse to himself for taking a drink.
15. He must disabuse his mind of any illusions about alcohol sharpening and polishing his wit and intellect.
16. He must learn to be tolerant of other people's mistakes, poor judgment and bad manners, without becoming emotionally disturbed.
17. He must learn to disregard the dumb advice and often dumber questions—of relatives and friends, without being disturbed emotionally.
18. He must recognize alcoholic day-dreaming—about past "good times," favorite bars, etc.,—as a dangerous pastime, to be inhibited by thinking about his reasons for *not* drinking.
19. He must learn to withstand *success* as well as failure, since pleasant emotions as well as unpleasant ones can serve as "good" excuses for taking a drink.
20. He must learn to be especially on guard during periods of changes in his life that involve some emotion or nervous fatigue.
21. He must try to acquire a mature sense of values and learn to be controlled by his judgment instead of his emotions.
22. He must realize that in giving up drinking he should not regard himself as a hero or martyr, entitled to make unreasonable demands that his family give in to his every whim and wish.
23. He must beware of unconsciously projecting himself into the role of some character in a movie, book or play who handles liquor "like a gentleman," and of persuading himself that he can—and will—do likewise with equal impunity.
24. He must learn the importance of eating—since the best preventive for that tired nervous feeling which so often leads to taking a drink is *food*—and must carry chocolate bars or other candy with him at all times to eat between meals and whenever he becomes restless, jittery or tired.
25. He must learn how to relax naturally, both mentally and physically, without the use of the narcotic action of alcohol.
26. He must learn to avoid needless hurry and resultant fatigue by concentrating on what he is doing rather than on what he is going to do.
27. He must not neglect care of his physical health, which is important to his rehabilitation.
28. He must carefully follow a daily self-imposed schedule which, conscientiously carried out, aids in organizing a disciplined personality, developing new habits for old and bringing out a new rhythm of living.
29. He must never relax his determination or become careless, lazy, indifferent or cocky in his efforts to eliminate his desire for alcohol.
30. He must not be discouraged by a feeling of discontent during the early stages of sobriety, but must turn this feeling into incentive to action which will legitimately satisfy his desire for self-expression.
31. He must not drop his guard at any time, but especially not during the early period of his reorganization, when premature feelings of victory and elation often occur.
32. He must understand that, besides abstinence, his real goal is a contented and efficient life.
33. He must appreciate the seriousness of his re-education, and regard it as the most important thing in his life.
34. He must realize that most people seeking psychologic help for abnormal drinking are above average in intellectual endowment, and that, while drinking means failure, abstinence is likely to mean success.
35. He must never feel that any one of these commandments is in any way inconsequential, or secondary to business, play, or whatnot; and must conscientiously observe every one of them, day in and day out.

In the medical psychologic approach it is also necessary by means of psychotherapy to have the individual develop inner peace so that he can live in the world, and in his world, without desiring or "needing" the socially accepted and easily available narcotic provided by any sort of alcoholic beverage.

This is finally accomplished by having the individual convince himself of the necessity of living automatically by and through the age-long enduring values of life, among which are:

(1) Be a giver instead of a taker. (Be as unselfish as possible.)

(2) Tolerance.

(3) Humility.

(4) A definite belief in the worthwhileness of life.

(5) The actual return to religion.

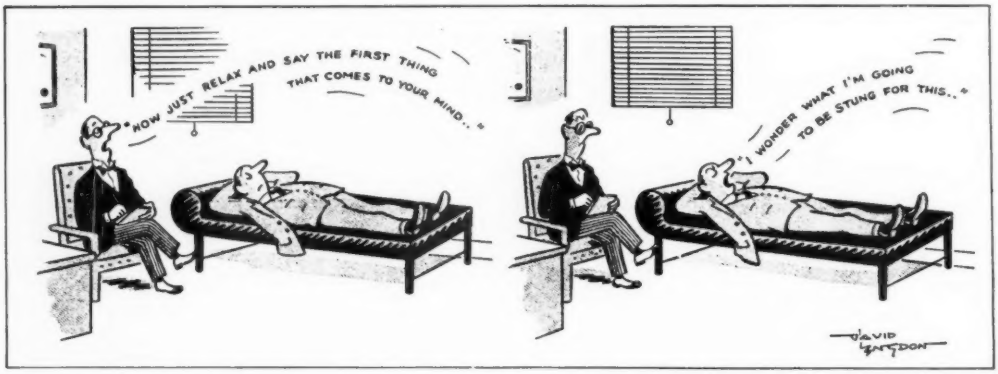
Through this acquiring or regaining of the enduring values, the successful patient develops a way of life which will give him inner peace and enable him to live without experiencing more anxiety, tension, hostility, frustration, etc., than he can handle; and when this is solidly achieved, he will not consciously or unconsciously be dominated to start drinking again.

One might mention here that some alcoholics have stopped drinking by themselves. Others have been helped by religious groups, lay groups, and lay-and-religious groups. Even the old "Keeley Cure" helped many an alcoholic—and some now recommend a conditioning or aversion treatment without psychotherapy. Others, with deeper interest, use this method in order to get a beach-head on the patient and then follow up with psychotherapy.

The author, as a result of personal discussions and conversations with other therapists, feels that, except in rare instances, deep, lengthy psychoanalysis alone, hypnosis alone, hypnoanalysis alone, narcoanalysis alone, or the assaultive therapies alone—such as chemical, drug, electric shock, or various types of lobotomy—are not helpful in the treatment of alcoholism. Generally speaking, especially trained psychiatrists are needed, and each alcoholic patient should be carefully examined and treated on an individual basis, in the same way as are cancerous and tuberculous patients.

In conclusion, one must keep in mind that just as the alcoholic of today is radically different from the alcoholic of yesterday, so, also, is the social drinker of today, as compared with the social drinker of yesterday.

And finally, with this thought in mind, the question: To Drink or Not to Drink alcoholic beverages, in the world and times we live in, is a question of the utmost seriousness, involving, one should remember, the welfare of others, also, and mutilation or sudden death.



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Seasonal Changes of Streptococci

ISOLATED IN STUDIES OF POLIOMYELITIS, ENCEPHALITIS AND RESPIRATORY INFECTION

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During studies on the etiologic relation of alpha streptococci to various diseases,[1-5] including some that now are considered attributable to filtrable viruses, a medium (autoclaved chick-embryo infusion) was found which does not turn acid from growth of streptococci.[6] This medium proved to be highly favorable for rapid growth and maintenance for a very long time of viability of streptococci. As cultures in this medium became old, extremely small and filtrable forms of the streptococcus appeared, and in some instances, filtrable transmissible agents resembling in their effects in animals those of the respective viruses were demonstrated.[6-8] Moreover, on prolonged storage of cultures in this medium at room temperature or in the incubator, changes in agglutinative titer and in virulence were found to occur seasonally in accord with the streptococci isolated in studies of current epidemics of poliomyelitis, encephalitis, and respiratory infection.

It is the purpose of this report to describe the methods used and to summarize the results of a long series of experiments with many strains of streptococci as isolated in studies of poliomyelitis, encephalitis, and respiratory infection, and as isolated from chick-embryo and blood-agar cultures after prolonged storage.

METHODS AND MATERIALS

Cultures were made from the nasopharynx and of emulsions and filtrates of emulsions of brain and spinal cord in persons suffering from poliomyelitis or encephalitis, from the brains of animals that died from epidemic encephalomyelitis, from the nasopharynx and sputum of persons having respiratory infections, and from the nasopharynx of well persons during and remote from epidemics. These materials were inoculated routinely into dextrose-brain broth[1] and on blood agar. The inoculated mediums were incubated overnight at 33 to 35° C. As growth occurred in the dextrose-brain broth, films were made and stained by the Gram method and counterstained with 2 per cent aqueous solution of safranine 0.

If microscopic examination revealed a pure or nearly pure culture of streptococci, 10 to 12 cc. of the primary culture and of pure cultures were poured into screw-capped vials and centrifuged. The cleared broth was poured off and the streptococci were suspended and partially dehydrated in chemically pure glycerin (2 parts) and 25 per cent solution of sodium chloride (1 part). The dense suspensions were kept at 10° C. for subsequent agglutination tests.

Pure cultures of streptococci for inoculation of animals and other studies were obtained, not from growth on blood agar, but from the end point of growth, of serial dilution cultures usually from single colonies, at the end point of growth in 0.2 per cent dextrose-brain agar, or from dextrose-brain broth.[9]

Subcultures of single colonies or from pure cultures in dextrose-brain broth from the end point of growth, in turn, made in dextrose-brain broth, and the sedimented growth from young cultures was suspended in the glycerin-saline solution menstruum. Subcultures of the purified strains were made into tall columns of autoclaved chick-embryo medium and on sealed blood-agar slants for storage and subsequent study, and on blood-agar plates to further check purity of cultures and to determine the type of streptococci.

The chick-embryo medium consisted of the mash (1 part), obtained by passing through a meat chopper nineteen-day hatching chicken eggs, including the shell, and distilled water (7 parts). The mixture of ground mash and water was kept in the refrigerator for twenty-four hours, and stirred at intervals meanwhile after which it was placed in tall columns in test tubes or bottles and autoclaved at 17 pounds pressure for twenty minutes. Titration was not necessary since the reaction was always at approximately *p*H 7. The medium then was layered with sterile liquid petrolatum and autoclaved for a few minutes at 17 pounds pressure to

*From the Mayo Foundation, Rochester, Minnesota, and Longview Hospital, Cincinnati, Ohio.

TABLE 1

AGGLUTINATIVE TITER OF ALPHA STREPTOCOCCI ON ISOLATION IN STUDIES OF POLIOMYELITIS AND ENCEPHALITIS AFTER STORAGE IN GLYCERIN-SODIUM CHLORIDE SOLUTION AND ON ISOLATION FROM CHICK-EMBRYO CULTURES AFTER PROLONGED STORAGE

SOURCE OF STREPTOCOCCI	TIME OF STUDY	EPIDEMIC CURRENT AT TIME OF AGGLUTINATION TESTS	SEASON	STREPTOCOCCI		PERCENTAGE INCIDENCE OF MAXIMAL AGGLUTINATION OF STREPTOCOCCI BY ANTISERUMS PREPARED WITH STREPTOCOCCI ISOLATED IN STUDIES OF				NO MAXIMAL AGGLUTINATION BY ANY ANTISERUM
						EPIDEMIC				
				STRAINS	CULTURES	POLIOMYELITIS	ENCEPHALITIS	RESPIRATORY INFECTION	ARTHRITIS	
Epidemic poliomyelitis	On isolation, 1936, '38, '39, '40, '41, '42, '43	Poliomyelitis	Summer and early autumn	156	207	**72**	13	5	**6**	4
	After in dense glycerol-NaCl solution suspension for 7 months to 4 years	Poliomyelitis	Summer	46	50	**60**	20	0	0	20
		Respiratory infection	Spring	44	64	**69**	17	2	9	3
	After storage in chick-embryo medium for 7 months to 4 years	None	Early summer	78	100	22	20	7	18	33
		Respiratory infection	Winter	42	57	9	19	**53**	5	14
Epidemic encephalitis and hiccup in persons and encephalomyelitis in horses, dogs, sheep, and chickens	On isolation, 1936, '37, '40, '41	Encephalitis	Summer	38	76	5	**80**	7	3	5
	After in dense glycerol-NaCl solution suspension for 1 to 7 years	None Encephalitis Respiratory infection	Summer Summer Winter	46	100	10	**78**	4	4	4
	After storage in chick-embryo medium for 1 to 7 years	Respiratory infection	Winter	60	105	4	15	**70**	6	5

insure sterility. The tubes and bottles were sealed with cotton plugs, rubber stoppers, or screw caps.

The cultures in the chick-embryo medium and those in blood-agar slants were incubated overnight at 34° C. when agglutinative titer and virulence tests were made of subcultures in dextrose-brain broth. Only those cultures which proved to contain specific strains were stored in the dark at room temperature for subsequent studies. The cotton plugs of the tubes containing the blood-agar cultures were thoroughly flamed and pushed into the tubes after twenty-four hours at 35° C. and were then sealed with sterile paraffined corks.

Subcultures for agglutination tests and inoculation of animals of the stored cultures in chick-embryo medium and on blood-agar slants were made in dextrose-brain broth during epidemics of respiratory infections, persistent hiccup, encephalitis, and poliomyelitis, and during interepidemic periods. Streptococci in young cultures of dextrose-brain broth (six to eighteen hours) were inoculated routinely into animals and the streptococci which were recovered from lesions were likewise suspended in glycerin-saline solution in the usual manner for agglutination tests.

Agglutination tests[4] were made with antiserums prepared in parallel manner in horses[10] with alpha streptococci isolated during studies respectively of encephalitis, poliomyelitis, colds and influenza, and arthritis. The antiserums used were highly specific, and had comparable agglutinin titers over the respective strains. The horses were immunized, not with streptococci grown concurrently during the long period of repeated injection, but with dilutions of the respective freshly isolated strains that were preserved in dense suspension (1000 billion streptococci per ml.) in the glycerin-saline solution. Antigenic specificity of the partially dehydrated streptococci in this menstruum was found in previous studies to be maintained almost indefinitely.

The serums for the agglutination tests were diluted 1:10, 1:40, 1:160, and 1:640 with saline solution containing 0.2 per cent phenol. The dense suspensions in glycerin-saline solution were diluted to 6,000,000,000 streptococci per ml. with saline solution to which 0.2

TABLE 2

AGGLUTINATIVE TITER OF ALPHA STREPTOCOCCI ON ISOLATION IN STUDIES OF MULTIPLE SCLEROSIS AND EPIDEMIC RESPIRATORY INFECTION AFTER STORAGE IN GLYCERIN-SODIUM CHLORIDE SOLUTION AND ON ISOLATION FROM CHICK-EMBRYO CULTURES AFTER PROLONGED STORAGE

SOURCE OF STREPTOCOCCI	TIME OF STUDY	EPIDEMIC CURRENT AT TIME OF STUDY	SEASON	STREPTOCOCCI		PERCENTAGE INCIDENCE OF MAXIMAL AGGLUTINATION OF STREPTOCOCCI BY ANTISERUMS PREPARED WITH STREPTOCOCCI ISOLATED IN STUDIES OF				NO MAXIMAL AGGLUTINATION BY ANY ANTISERUM
						EPIDEMIC				
				STRAINS	CULTURES	POLIOMYELITIS	ENCEPHALITIS	RESPIRATORY INFECTION	ARTHRITIS	
Multiple sclerosis	On isolation, 1943	None	Summer	12	38	**24**	**61**	8	0	8
				10	13	**38**	**54**	0	8	0
	After in glycerol-NaCl solution suspension for 10 months	Respiratory infection	Spring	10	13	**38**	**62**	0	0	0
	After storage in chick-embryo medium for 10 months	Respiratory infection	Spring			0	23	**77**	0	0
Epidemic respiratory infection	On isolation, 1940, '41, '42, '43, '44	Respiratory infection	Winter and spring	40	59	3	12	**72**	8	5
	After in glycerol-NaCl solution suspension for 5 to 6 years	Respiratory infection	Spring	12	12	0	17	**75**	8	0
	After storage in chick-embryo medium for 5 months to 1 year	Encephalitis	Summer	17	33	**21**	**58**	9	6	6
		Respiratory infection	Autumn Winter Spring	41	52	2	12	**65**	12	9

per cent phenol was added. Two-tenths ml. of these and 0.2 ml. of the serum dilutions were added to test tubes (10 by 75 mm.) and thoroughly mixed and incubated for eighteen hours at 50° C., instead of at 37° C. as is customary.

Readings were made in a dark room under a strong, shaded light against a nonreflecting black velvet background. The degree of agglutination was recorded according to the arbitrary scale of 0 to 4 plus. The percentage of maximal agglutination as indicated in tables refers to cultures and not to strains.

Rabbits were inoculated intracerebrally with 0.1 ml. of 1:10,000 dilutions in sodium chloride solution of the dextrose-brain broth cultures from original material, from the stored cultures in chick-embryo medium, and from cultures on blood-agar slants. Dilutions of cultures were made just before inoculation. Mice were inoculated intracerebrally with 0.03 ml., intranasally with 0.06 ml., and intraperitoneally with 1.2 ml. of the undiluted dextrose-brain broth cultures.

RESULTS OF AGGLUTINATION TESTS

THE results of a large number of agglutination tests made with antiserums prepared with streptococci isolated in studies of poliomyelitis, encephalitis, respiratory infections, and arthritis and with many of the respective strains of streptococci are summarized in Table 1. The streptococci as isolated from original source and after storage in glycerin-sodium chloride solution were agglutinated maximally in high incidence by the respective antistreptococcal serums characteristic of the epidemic in studies of which the streptococci were isolated; whereas those isolated from the stored chick-embryo cultures had either lost specificity to the different antiserums during interepidemic periods or had changed to types characteristic of the streptococci of the current epidemic in question.

Agglutinative titer of streptococci isolated in studies of multiple sclerosis and epidemic respiratory infections are depicted in Table 2. A high degree of specific agglutination of the respective streptococci on isolation

TABLE 3

AGGLUTINATIVE TITER OF ALPHA STREPTOCOCCI AFTER PROLONGED STORAGE OF RESPECTIVE STRAINS ON BLOOD-AGAR SLANTS IN SEALED TUBES

SOURCE OF STREPTOCOCCI	STORAGE	AGE IN YEARS OF CULTURES ON BLOOD-AGAR SLANTS	STREPTOCOCCI		PERCENTAGE INCIDENCE OF MAXIMAL AGGLUTINATION OF STREPTOCOCCI BY ANTISERUMS PREPARED WITH STREPTOCOCCI ISOLATED IN STUDIES OF				NO MAXIMAL AGGLUTINATION BY ANY ANTISERUM
					EPIDEMIC				
			STRAINS	CULTURES	POLIOMYELITIS	ENCEPHALITIS	RESPIRATORY INFECTION	ARTHRITIS	
Epidemic poliomyelitis	1924 to 1944	20	9	9	**67**	33	0	0	0
Epidemic encephalitis	1929 to 1944	15	20	21	5	**85**	10	0	0
Multiple sclerosis	1929 to 1944	15	6	13	8	**85**	8	0	0
Epidemic respiratory infection	1928 to 1944	16	8	18	0	17	**73**	5	5
Subacute and chronic arthritis	1928, '29, '30 to 1944	14 to 16	10	15	0	13	0	**87**	0
	1935, '41, '43 to 1944	1 to 9	12	15	0	7	13	**80**	0
Control well persons	1922 to 1944	22	10	10	0	20	10	0	**70**

and after storage in glycerin-saline was obtained. In sharp contrast, the streptococcus isolated in studies of multiple sclerosis had changed in stored chick-embryo cultures from "neurotropic" to "pneumotropic" type in accord with the seasonal occurrence of respiratory infections.

The streptococci on isolation during epidemics of respiratory infections in winter and spring had changed in stored chick-embryo cultures from "pneumotropic" to "neurotropic" type in summer during an epidemic of encephalitis and in turn reverted to "pneumotropic" type during further storage into autumn, winter, and spring as epidemic respiratory infections occurred.

Alpha streptococci that had been isolated similarly in studies of poliomyelitis, encephalitis, colds, influenza, and arthritis and which were kept on blood-agar slants sealed with paraffined corks and stored in the dark at room temperature, often remained viable without transfer for a very long time, in some instances as long as twenty-two years. The gas in the sealed tubes of the old cultures was found to have a high concentration of carbon dioxide and concentrated extracts of the blood-agar medium were mildly acid in reaction. Subcultures were made in dextrose-brain broth and suspensions of the streptococci were subjected to agglutination tests in the usual manner. Breaking the seal of the blood-agar slants that contained viable organisms after years of storage with the entrance of oxygen promptly caused death of the organisms.

The results of agglutination tests with the streptococci isolated from the stored blood-agar slants are summarized in Table 3. Each group of strains was agglutinated maximally in highest incidence by the respective specific antiserums despite the long period of storage regardless of season or current epidemics. Streptococci isolated from control well persons remote from epidemics, similarly kept on sealed blood-agar slants, were not agglutinated differentially by the respective antiserums.

RESULTS OF EXPERIMENTS IN ANIMALS

The results in animals following inoculation of streptococci on isolation in summer in studies of poliomyelitis and the same respective strains on isolation in winter from the stored chick-embryo cultures during epidemic influenza are summarized in Table 4. It will be seen that the mortality and incidence of lesions of the lungs in rabbits on cerebral inoculation and in mice on cerebral, nasal, and peritoneal inoculation of streptococci on isolation in summer in studies of poliomyelitis and encephalitis were consistently far less than following inoculation of the same strains of streptococci in comparable dosage on isolation from stored cultures in chick-embryo medium during the occurrence of epidemic influenza in winter.

The mortality, incidence of symptoms, and lesions in rabbits following cerebral inoculation of streptococci in comparable dosage as isolated in studies of epidemic poliomyelitis and influenza and the same respective strains as isolated months later from stored chick-embryo cultures are summarized in Table 5. It will be seen (1) that the mortality and incidence of flaccid paralysis were high and lesions of lungs were low following inoculation of streptococci on isolation in studies of poliomyelitis; (2) that the mortality and lesions of lungs were high and flaccid paralysis low or absent following inoculation of the same strains of streptococci isolated from the stored chick-embryo cultures three

TABLE 4

RESULTS IN RABBITS AND MICE FOLLOWING INOCULATION OF STREPTOCOCCI ON ISOLATION DURING SUMMER IN STUDIES OF EPIDEMIC POLIOMYELITIS AND ENCEPHALITIS IN PERSONS AND EPIDEMIC ENCEPHALOMYELITIS IN ANIMALS AND ON ISOLATION FROM STORED CHICK-EMBRYO CULTURES OF THE SAME STRAINS IN WINTER DURING EPIDEMIC INFLUENZA

INOCULATIONS	SPECIES	STRAINS	CONDITIONS UNDER WHICH INJECTIONS WERE MADE*	ANIMALS		
				INOCULATED	PERCENTAGE THAT DIED	PERCENTAGE THAT HAD LESIONS OF LUNGS**
Cerebral	Rabbit	30	On isolation	71	48	40
			During epidemic of influenza	62	**70**	**77**
Cerebral	Mouse	23	On isolation	60	30	17
			During epidemic of influenza	38	**61**	**58**
Nasal	Mouse	26	On isolation	122	22	11
			During epidemic of influenza	95	**27**	**63**
Peritoneal	Mouse	11	On isolation	31	16	6
			During epidemic of influenza	15	**73**	**73**

*The dosage of streptococci injected on isolation and after storage of cultures in chick-embryo medium were comparable and consisted of subcultures in dextrose-brain broth incubated at 34° C. for eighteen to twenty hours.
**Percentages in rabbits are based on number of animals that died; in mice on number that were inoculated.

months later during an epidemic of influenza; (3) that the distribution of symptoms and lesions following inoculation again of the same strains of streptococci isolated from the same stored chick-embryo cultures after five additional months of storage were those characteristic of the current epidemic of persistent and postoperative hiccup; (4) that the incidence of lesions of lungs was very high and flaccid paralysis did not occur following inoculation of the streptococci as isolated during studies of an epidemic of influenza, and (5) that "pneumotropic" virulence of the streptococcus characteristic of influenza was lost during storage in chick-embryo medium for five months as influenza had disappeared and as the same epidemic of persistent and postoperative hiccup occurred. A high incidence of tremors, spasms of the diaphragm and other muscles, and lesions of the diaphragm characteristic of the epidemic occurred instead.

THE results of cerebral inoculation of mice (not shown in the tables) with the nine strains that were isolated in studies of poliomyelitis, referred to in Table 5, were similar to those obtained in rabbits. Thus, of 63 mice which received the streptococci on isolation in studies of poliomyelitis, 33 (52 per cent) died, 38 (60 per cent) with flaccid paralysis. Only 4 of these (12 per cent) had lesions of lungs. Of 50 mice which received cultures of the same strains after storage in chick-embryo medium into the epidemic of influenza, 27 (54 per cent) died. Seventeen (63 per cent) revealed lesions of lungs and flaccid paralysis did not occur in any.

Rabbits and mice usually remained well and free from lesions following inoculation of dextrose-brain broth cultures of streptococci on isolation from the stored blood-agar slants. This was true regardless of seasonal occurrence or type of epidemics current at the time animals were inoculated.

During the course of these experiments, pertinent to the problem involved, a bacteriologic study was made of indoor and outdoor air and from water, milk, flies, and mosquitoes during and remote from epidemics of poliomyelitis, encephalitis, persistent hiccup, and influenza. Comparable amounts of air were drawn through dextrose-brain broth, dextrose broth, chick-embryo medium, and distilled water by means of an electrically driven vacuum pump for stationary indoor samplings and by tapping the vacuum line of automobile engines for mobile outdoor samplings.

Streptococci having cultural, serologic, localizing properties, and cataphoretic velocity, similar to those isolated from persons having the respective infections during concurrent epidemics were isolated from air in high incidence in dextrose-brain broth and the chick-embryo medium, and less often in dextrose broth and distilled water after exposure to air.[10-12] Interface precipitation tests made with the exposed water, after it had been brought to isotonicity and antistreptococcic serums revealed a high incidence of clouding at the interface with the respective antiserums prepared with alpha streptococci isolated in studies of the epidemic diseases in question.[13, 14]

TABLE 5

RESULTS IN RABBITS FOLLOWING INOCULATION OF STREPTOCOCCI AS ISOLATED IN STUDIES OF EPIDEMIC POLIOMYELITIS AND INFLUENZA AND FOLLOWING INOCULATION OF THE SAME STRAINS AS ISOLATED MONTHS LATER FROM STORED CHICK-EMBRYO CULTURES

SOURCE OF STREPTOCOCCI	CONDITIONS UNDER WHICH THE INJECTED STREPTOCOCCI HAD BEEN KEPT	STRAINS	RABBITS		SYMPTOMS (PER CENT)*				LESIONS (PER CENT)*		
			INOCULATED	PER CENT THAT DIED	TREMORS	SPASMS OF DIAPHRAGM	SPASMS OF OTHER MUSCLES	FLACCID PARALYSIS	DIAPHRAGM	LUNGS	STOMACH
Epidemic poliomyelitis	On isolation during an epidemic	8	20	90	15	0	0	**80**	0	17	0
	After growth in chick-embryo medium for 3 months well into an epidemic of influenza	9	36	81	19	0	0	**72**	0	24	0
			25	88	16	0	0	28	0	**90**	0
	After growth in chick-embryo medium for 8 months into an "epidemic" of persistent and postoperative hiccup		15	53	**60**	**40**	**73**	0	**25**	38	50
Epidemic influenza	On isolation	9	13	47	38	0	15	0	0	**90**	0
	After growth in chick-embryo medium for 5 months into an "epidemic" of persistent and postoperative hiccup		13	23	**77**	**23**	**62**	0	**33**	33	33

*Percentages of symptoms based on the animals inoculated and percentages of lesions based on the number of animals that died.

SUMMARY AND COMMENTS

A BACTERIOLOGIC and epidemiologic study made over a period of years of a large number of strains of alpha streptococci in their relation to the seasonal occurrence of epidemics of poliomyelitis, encephalitis, and respiratory infections is reported.

Alpha streptococci as isolated by my methods in studies of epidemic poliomyelitis, encephalitis, hiccup, multiple sclerosis, and respiratory infections, including influenza in human beings and in spontaneously occurring epidemics of encephalomyelitis in animals, while morphologically and culturally indistinguishable, were found highly specific serologically and in localizing and disease-producing properties.[4, 6, 13, 14]

When grown aerobically in the usual manner on solid mediums and in liquid mediums such as dextrose broth in which acid is produced, specific properties often disappeared promptly, and isolations of respective specific strains in these mediums usually were unsuccessful.

When specific strains, isolated in mediums affording a reduced or gradient of oxygen tension were grown in sealed tubes of blood-agar slants, they often remained viable for years due to high concentration of carbon dioxide, retained original serologic properties, but lost animal virulence.

When grown for twenty-four hours at 34° C. and then stored in the dark at room temperature in tall columns of autoclaved chick-embryo medium layered with oil, the respective streptococci remained viable for years, small filtrable and "virus" forms sometimes developed,[8, 14, 15] and changes in serologic and localizing properties or virulence occurred in accord with alpha streptococci associated with or the cause of current seasonal epidemics.

Alpha streptococci that possessed properties characteristic of streptococci associated with or the cause of epidemic diseases have been demonstrated not only in persons stricken, contacts and noncontacts during respective epidemics, but also broadly in nature such as in water, milk, flies, mosquitoes, and indoor and outdoor air during epidemics.[11, 12] Such specific properties have not been demonstrable in alpha streptococci similarly isolated remote from epidemics.[16]

The data adduced indicate that some atmospheric influence in nature in temperate climates may be operative in causing streptococci normally present in human beings and broadly in nature and in stored cultures in autoclaved chick-embryo medium to acquire properties characteristic of streptococci associated with, or the cause of, recurring seasonal epidemic diseases which involve chiefly the nervous system in summer months and the respiratory tract in winter months in temperate climates.

The parallelism between the seasonal in vitro

changes and those which occurred in human beings and in nature in accord with epidemics reported herewith was so striking, occurred so often over a period of many years in Rochester, Minnesota, and surrounding environs and since in Pasadena, California, and Cincinnati, Ohio (to be reported elsewhere), as to leave little doubt as to the importance of this phenomenon in pathogenesis and hence control of the respective epidemic diseases.

Changes in cataphoretic velocity and virulence of streptococci were induced by exposing cultures to the high frequency field.[17] Mutations or dissociations in the bacteria and viruses produced by others on exposure to x-rays, ultraviolet, and other radiations, suggest that the influence causing the changes in streptococci may be some form of radiant energy. The nature of such energy is under study. The data obtained appear to be of great practical significance.

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COMING POSTGRADUATE COURSES

East

The George Washington University School of Medicine, Washington, D. C.

Anesthesiology, February 27-March 3
Pediatrics, March 6-10
Current trends in internal medicine, March 13-17
Surgical physiology, March 20-24
Obstetrics and gynecology, March 27-31
Psychiatry, April 3-7

Midwest

University of Kansas Medical Center, in cooperation with The Kansas Medical Society and the Kansas State Board of Health, Kansas City, Kansas

Diseases of the heart and circulation, each Thursday, January 12-March 16, 1950

University of Minnesota Medical School, Minneapolis

Symposium on hypertension, September 18-20, in honor of Doctors E. T. Bell, B. J. Clawson and G. E. Fahr and sponsored by the Variety Club, Mayo Foundation and the University

Continuation course in gastrointestinal diseases for general physicians, emphasizing diagnosis and management of disorders of the gastrointestinal tract, at the Center for Continuation Study, March 6-8, 1950. Faculty will include clinical and full-time members of the University of Minnesota Medical School and the Mayo Foundation

Washington University School of Medicine and Affiliated Hospitals, St. Louis, Missouri

Postgraduate course in cancer for the general practitioner, March 14-17

Scientific Exhibit

Surgical Jaundice

ALBERT BEHREND, M. D., MOSES BEHREND, M. D.,
BENJAMIN GREENSPAN, M. D., MILTON CULLEN, M. D.
and HYMEN D. STEIN, M. D

JEWISH HOSPITAL, PHILADELPHIA

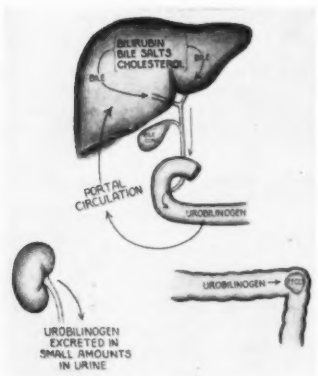
ETIOLOGY

1. INFLAMMATORY—69%
   - *a.* Calculous cholecystitis and choledochitis 44%
   - *b.* Cholangitis 14%
   - *c.* Pancreatitis 7%
   - *d.* Sub-hepatic abscess 45%
   - *e.* Parasites

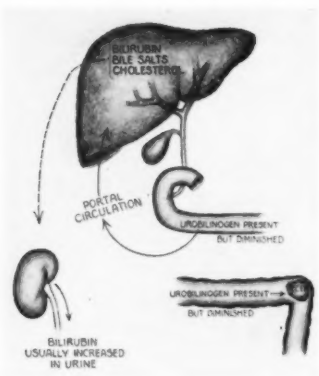
2. TUMOR—28%
   - *a.* Gallbladder carcinoma 7%
   - *b.* Bile duct carcinoma or papilloma 4%
   - *c.* Papilla of Vater carcinoma 2%
   - *d.* Pancreatic tumor or cyst 16%
   - *e.* Metastatic carcinoma
   - *f.* Cystic duct cyst

3. STRICTURE OF BILE DUCTS—3%
   - *a.* Postoperative
   - *b.* Congenital

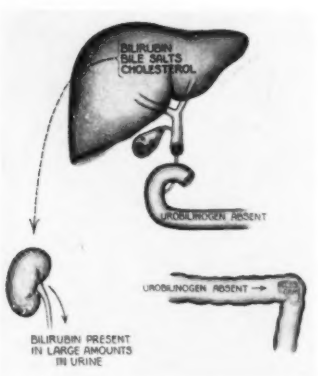
PHYSIOLOGY OF THE BILIARY SYSTEM



Normal



Hepato-cellular Jaundice



Obstructive Jaundice

DIFFERENTIAL DIAGNOSIS

The diagnosis of surgical jaundice versus nonsurgical jaundice may be difficult. Evaluation of the history, physical examination and laboratory tests may leave the issue in doubt. In such cases, surgical exploration is indicated after a fair trial of medical treatment (2 to 6 weeks).

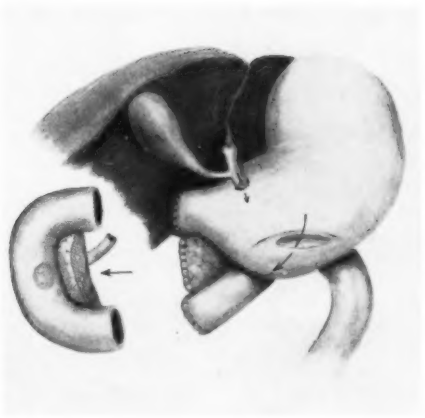
SURGICAL JAUNDICE	NONSURGICAL JAUNDICE
1. R.U.Q. pain common.	1. R.U.Q. pain uncommon.
2. More common in middle age.	2. More common in younger age group.
3. History of preceding attacks, pregnancy, operation.	3. History of exposure to toxic drugs, other cases of jaundice, blood or plasma transfusions.
4. Gallbladder often palpable.	4. Gallbladder seldom palpable.
5. No splenomegaly.	5. Splenomegaly common.
6. X-ray may show stones or pancreatic tumor.	6. X-ray noncontributory.
7. Feces gray or putty-color.	7. Feces return to normal color in a few days.
8. Duodenal drainage may show crystals or pigment.	8. Duodenal drainage normal.

Liver function tests used in conjunction with the above data will usually establish the proper diagnosis.

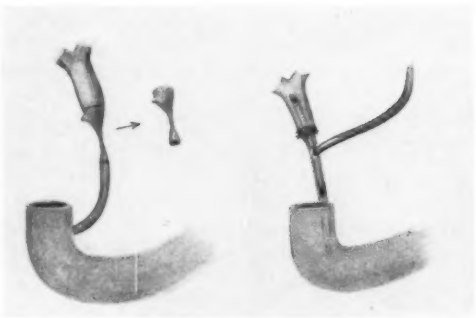
EVALUATION OF LIVER FUNCTION TESTS

	NORMAL	SURGICAL JAUNDICE (Obstructive)	NONSURGICAL JAUNDICE (Hepato-cellular)
Serum Bilirubin	0.1-1.0 mg./100 cc.	Increased	Increased
Icterus Index	4-6	Increased	Increased
Van Den Bergh		Direct positive	Direct positive, occasionally biphasic or negative
Urobilinogen Feces	40-280 mg./24 hours	Absent, or present only in small amounts — in complete obstruction such as carcinoma	Present, but may be diminished, especially in acute phase
Urine	0-4 mg./24 hours		Usually present and increased
Bromsulfalein *2 mg./kg. of body wt.*	None remains in blood after 30 minutes	Dye retained, but usually in proportion to degree of hyperbilirubinemia	Degree of dye retention depends on amount of functional impairment
Galactose Tolerance *(40 gm. by mouth)*	3 gm. or less excreted in 5 hours	May show increased excretion	More than 3 gm. excreted in 5 hours
Hippuric Acid Oral *(6 gm. sod. benzoate)*	3 gm. excreted in urine in 4 hours	May be normally excreted	Diminished excretion
Intravenous *(1.77 gm. sod. benzoate)*	1 gm. or more excreted in urine in 1 hour	May be normally excreted	Diminished excretion
Plasma Cholesterol	140-250 mg./100 cc.	Increased	Normal or decreased
Cholesterol Esters	90-170 mg./100 cc. (67-70% of total)	Ratio of plasma cholesterol to cholesterol esters remains normal	Proportion of esters diminished
Cephalin Flocculation	No flocculation	Usually no flocculation	Flocculation occurs (plus to 4 plus)
Thymol Turbidity	4 units or less	Normal	Turbidity in excess of 4 units
Plasma Prothrombin	100% (as determined by method employed)	Normal or slightly reduced: but value returns to normal—administration of adequate vitamin K	Reduced and low even after adequate vitamin K
Alkaline Phosphatase	1.5 to 4 Bodansky units	Increased (above 20 units)	Increased

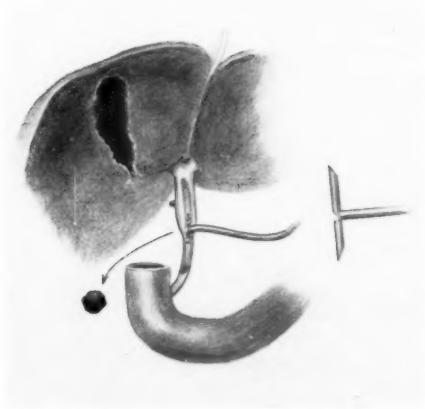
Palliative. Cholecystojejunostomy or choledochojejunostomy or duodenostomy for incurable malignancy or chronic pancreatitis.



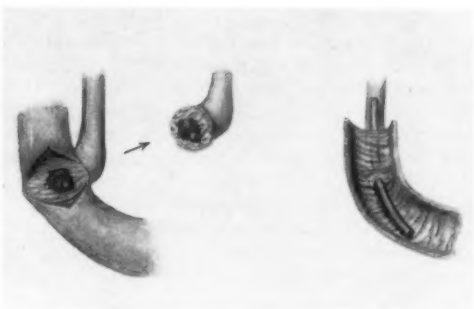
Whipple type of operation for carcinoma of pancreas or papilla of Vater.



Reconstruction of common duct over T-tube for stricture.



Cholecystectomy and choledocholithotomy with T-tube drainage.



Local excision of tumor of papilla of Vater with reconstruction over tube.

GENERAL PRACTICE *Review*

To provide the general practitioner, as well as the specialist with concise, readily available information on the latest, proved methods of treatment of conditions commonly encountered in an average practice, POSTGRADUATE MEDICINE *offers this department to its readers. It is not, of course, intended to present these discussions as the only acceptable therapeutic procedures to be used, but rather to offer simple regimens and recommendations based on the extensive experience of the physicians who prepared these summaries.*

Simple Rib Fracture

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FROM THE CLEVELAND CLINIC AND THE FRANK E. BUNTS EDUCATIONAL INSTITUTE

ETIOLOGY AND PATHOLOGY

Most rib fractures are due to extrinsic trauma. Usually there will be a history of a blow to the chest wall sustained in an accidental fall, fight, athletic contest, or other physical activity. The association of the injury and the subsequent disability makes the causative factors obvious. Occasionally, however, when the trauma is sustained during great emotional stress or under the influence of alcohol, the patient may have no recollection of the responsible injury. It is surprising that some patients with simple rib fractures cannot or will not account for the cause. In older patients the trauma may be intrinsic, due to severe coughing, choking, or sneezing.

The majority of rib fractures are simple and complete. The fracture may be single or multiple, and occasionally bilateral in crushing types of injuries. There may be associated soft tissue damage demonstrated by an accompanying hematoma. Occasionally there will be a subpleural manifestation noted on the roentgenogram of the thorax. Most important, however, is the pain attributed to the disruption of the periosteum and injury to the accompanying intercostal nerve.

SYMPTOMS AND SIGNS

Pain is usually localized directly over the fracture site. Characteristically, it is made worse by deep inspiration, coughing, or sneezing. The intensity diminishes when the patient holds his breath for a few moments.

Tenderness in most cases is localized directly over the fracture site and can be isolated with the fingertip. If the fracture is posterior or subscapular, it may not be accessible to palpation. In the latter case, compression of the thorax with the examiner's hands in both axillae will elicit the exact point of tenderness.

Crepitation may be felt by gentle manipulation over the point of maximum pain and tenderness. Occasionally crepitus is audible through the stethoscope. This sign will be absent if the fracture is incomplete or if there is a great deal of soft tissue over the fracture site.

X-ray—A simple rib fracture may be surprisingly elusive on the roentgenogram. This is particularly true of fractures of the anterior chest wall and the so-called costochondral separations. The principal value of the x-ray is in the evaluation of the underlying lung. In most cases of simple rib fracture the attending physician may rely on physical findings and dispense with fluoroscopy or roentgenographic examination.

TREATMENT

Simple rib fractures usually heal well in persons of all ages. There is usually no associated structural disability or deformity. Treatment is usually confined to the control of pain which is the dominant symptom. Multiple fractures, though simple, may produce instability of the overlying chest wall and present a greater problem than the control of pain. In such cases, immobilization and prophylaxis

against pulmonary complication must be considered.

Immobilization—The practice of chest strapping has been accepted for many years. In spite of the wide use of this venerable custom in treatment of simple fracture, its value is limited. To control pain by immobilization requires liberal use of adhesive bandage or tape completely around the chest. In the older age groups this practice may be hazardous because of the limitation of respiratory excursions. Many patients cannot tolerate strapping because of skin irritation.

When immobilization is used for a rib fracture, care must be taken to remove excess hair on the thorax. A protective layer of tincture of benzoin is helpful. The straps should be placed completely around the chest with the patient in the phase of expiration. Fractures above the fifth rib are but rarely benefitted by strapping.

Injection—Perhaps the simplest and most effective treatment is the control of pain produced by simple rib fracture. The fracture itself is of little pathologic significance but the associated pain can produce morbidity. The pain follows the course of the intercostal nerve and is exacerbated by any motion of the chest wall. In multiple fractures the pain may be severe enough to produce a shock-like state. In elderly patients the involuntary splinting of the chest because of pain can produce hypostasis or atelectasis.

The injection treatment requires the instillation of an anesthetic agent at the fracture site or in the nerves proximal to the fracture. A simple procedure consists of examining the patient in a sitting position with clothing removed above the waist.

The fracture site is localized and the overlying skin marked with ink or pencil. The skin is prepared with an antiseptic. A skin wheal is raised with procaine hydrochloride 1 per cent, directly over the rib involved, posterior to the fracture. With a 2-inch needle the infiltration of 1 per cent procaine hydrochloride may be carried down to the rib and then into the intercostal bundle above and below it. Usually there will be fairly prompt relief if the infiltration reaches the involved nerve. It may be better to inject two or three interspaces above and below if the injury to the chest wall is fairly extensive.

When relief has been obtained a second injection may be used employing a long-acting agent such as nupercaine in oil. It is not necessary or desirable to strap the chest after intercostal injection. Additional support with analgesics such as codeine and aspirin may be needed. Injections may be repeated daily if necessary.

The chief advantages of the injection method are: (1) its simplicity; (2) relief of pain obtained, and (3) mobilization.

Treatment of Exstrophy of the Bladder

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Exstrophy of the bladder is one of the most distressing congenital anomalies. The technical surgical procedures for its repair are not within the scope of this paper, but much of the surgical success will depend upon the cooperation of the parents and on the interest and attention of the attending family physician. The information obtained from a large series of these patients, followed for ten to twenty years, is presented with this in mind, for much can be done to reassure and encourage the parents of an infant with this anomaly.

More than 50 cases of ureteral transplantation for exstrophy of the bladder have been handled at Children's Hospital in the last twenty years. There have been no operative deaths, and no fatal cases of peritonitis.

The faulty embryology in this condition can best be visualized by assuming that a sound has been passed through the external urinary meatus into the bladder and then pulled out ventrally. In other words, there is a complete failure of all three layers, entoderm, mesoderm, and ectoderm, to fuse in the midline. The skin, subcutaneous tissue, fascia, muscles, bony structures, and the urinary mucous membrane are separated in the midline.

One sees the floor of the urethra (with the split penis in the male and the bifid labia in the female), the trigone and posterior wall of the bladder presenting on the lower abdominal wall. The two rectus muscles are attached to their normal insertion on the pubic bones, but as the symphysis is separated, this leaves a triangular muscular defect in the lower abdominal wall. On crying or straining, the mucous membrane of the bladder is forced out and upwards and presents, not as a deep

pocket, but as a herniated mass of mucous membrane. The term, occasionally seen in the lay press, "inside out bladder" is very descriptive.

In the female, the internal genitalia are present and normal in the usual case. In the usual male case the testes, vas, and vesicles are present and normal. The penile shaft is small, underdeveloped, and split on its ventral surface, exposing the floor of the urethra. On the floor of the prostatic urethra lie exposed the ejaculatory ducts. The ureteral orifices may be seen low on either side of the exposed mucous membrane of the bladder, and exhibit their usual peristaltic action as shown by frequent spurts of urine. The split and hooded prepuce is seen below the glans.

Before operation these children lead a life of almost complete social ostracism and the primary object of surgery is to provide them with urinary control. Reconstruction of the bladder is seldom successful, as it does not provide, in the usual case, normal sphincter control at the bladder outlet.

Urinary control is best accomplished by transplantation of the ureters to the rectosigmoid. The follow-up study of cases for as long as twenty years has shown a very gratifyingly high percentage of success, not only in adequate urinary control, but a minimal amount of retrograde infection of the ureters and kidneys.

It is interesting to observe that the few cases of postoperative peritonitis (all nonfatal) that developed in this series were about equal in the preantibiotic and the postantibiotic eras. The use of antibiotics is advocated as an additional safeguard; their use, however, does not supplant good surgical technic.

While awaiting operation, the care of urinary incontinence presents some annoying difficulties. The child is constantly wet because of the continuous flow of urine from the ureters. There is no bladder reservoir which, in the normal child, permits an accumulation of urine for a period of time. This constant wetting irritates the normal skin, but this irritation can be greatly alleviated by protecting the exposed skin with boric acid ointment.

The exposed mucous membrane of the bladder is subject to irritation, but in the usual case it can be greatly helped, or indeed obviated, by keeping the exposed mucous membrane covered with a clean, soft cloth, well impregnated with boric acid ointment. Over this may be placed absorbent pads, held in place by the diapers. It is not necessary that these pads be surgically sterile. Indeed, it is wise not to use sterile gauze pads next to the bladder as the coarse mesh becomes adherent to the exposed mucous membrane and often results in a certain amount of bleeding and oozing from this surface. Absorbent cotton is also to be avoided for the same reason. The best material to use is a piece of an old sheet that has been washed and ironed. This, when covered with boric acid ointment, provides protection and adequate sterility. The absorbent pads rest on this piece of cloth and do not become enmeshed with the exposed mucous membrane.

Ordinary sanitary napkins are very useful. The expense of sterile surgical pads is unnecessary and undesirable. The bleeding is not serious. The exposed mucous membrane becomes less tender as the weeks go by and it is less likely to bleed. There is no contraindication for the usual bathing routine.

AGE OF CHOICE FOR OPERATION

The ideal time for transplantation of the ureters is between 2 and 5 years of age. By this time the child should have acquired voluntary control of his bowels and will be old enough to appreciate the efforts made to train him in the control of both urine and feces by intelligent bowel routine. It is desirable that these procedures be done before school age. Transplantation of the ureters can be done in the first few weeks or months of life, but it is our opinion that bowel training is made much more difficult if the infant has to contend with the problem of the control of both urine and feces by rectum.

Some authors advocate transplanting the ureters early in order to forestall any retrograde ureteritis and pyelonephritis caused by the exposed position of the ureteral orifices. This retrograde infection in our experience, rarely, if ever, occurs unless there is some other associated obstructive anomaly. Free and constant ureteral peristalsis seems to prevent this. Moreover, early transplantation done to prevent retrograde infection caused by the exposed site of the ureteral orifices is not valid, in that the ureters are transplanted to the rectosigmoid, which can hardly be a less infectious area than that of the exstrophied bladder. Up to 2 or 3 years of age, urinary incontinence, while annoying, is not unusual even in the normal child, and should not cause any great psychologic trauma either to the child or the parents.

Transplanting the ureters for exstrophy has as one of its primary objects the prevention of retrograde infection of the ureters and kidneys. In these patients, one hopes for a long period of life. There is not the need for haste as in ureteral transplants following cystectomy for malignant disease.

Every effort should be made to have the transplantation done in such a way that both ureters enter the lumen of the bowel without angulation or constriction. Therefore, it is usually more desirable to transplant each ureter at a separate operation. Because of the exstrophied bladder, it is difficult to do both ureters through a single incision. A better exposure is obtained by doing the right ureter through a right rectus incision and the left ureter through a left rectus incision. This better

exposure lessens the danger of angulation or stenosis at each anastomosis. The saving of time is of far less importance than in cases of malignancy.

In recent years bilateral transplantation has been done at one operation. Time alone will show whether the results will be as satisfactory as those obtained by the two-stage method. At present, the transplanting of one ureter at a time seems to show better late results. The added time in hospital should not be more than two weeks.

Some weeks or months after the ureters have been transplanted, the exstrophied mucous membrane of the bladder should be excised and a repair of the lower abdominal wall performed. It is seldom possible to close entirely the defect between the rectus muscles and a review of cases many years after operation suggests that an absolute anatomic repair is not needed. Although these patients cannot, or should not, take part in sports such as football, they are able to play tennis, golf, to swim, dance, and so on without any ill effects caused by the abnormal lower abdominal musculature.

In the female, at the time of resection of the exstrophied bladder, the plastic to the lower abdominal wall and labia is done. In most cases a very satisfactory cosmetic result is obtained and there is no further problem. These females can take part in all the usual activities of their sex. They can look forward to successful marriage and the bearing of children, as has been shown in our series, as well as in those of other authors.

In the male, the repair of the epispadias has for its object the construction of a mucous membrane lined passage from the ejaculatory ducts to the normal site of the urethral meatus to provide an exit for the seminal fluid. In the usual male case, the patient has libido and the problem of successful impregnation is a mechanical one. The solution of the problem depends on the degree of success obtained in constructing the urethra and on the degree of underdevelopment in size of the organ; little can be done for the latter.

FIGURE 1. Female. Intravenous pyelogram made seventeen years after transplantation of the left ureter into the rectosigmoid. There is no evidence of dilatation of the kidney, pelvis, or ureter. The right kidney was removed because of a severe degree of pyelonephritis, caused by a mass of aberrant uterine tissue at the right uretero-vesicle orifice and which had almost completely obstructed the right ureter. Note wide separation of the symphysis. At the time of this pyelogram the patient was a student nurse and experienced no difficulty in carrying on her work.

SPECIAL CONSIDERATIONS IN PRE- AND POSTOPERATIVE CARE

There is always the possibility of other associated anomalies and it is desirable to have an intravenous pyelogram made sometime within the first few months. This will demonstrate any degree of infection of the ureters and kidneys. Ureteritis and pyelonephritis are very rare and if present are usually the result of another associated obstructive lesion (Figure 1). Pyelograms will also demonstrate the presence of such anomalies as double ureters, double kidneys, and so on.

Careful examination should be made of the rectal sphincter to assure that it is normal. With an incompetent rectal sphincter such as might be caused by a nerve lesion in spina bifida occulta, it is futile to consider transplantation of the ureters. The competency of a rectal sphincter can be better evaluated when the child is 2 or more years of age.

There is, not infrequently, an associated inguinal hernia in the male. If the hernia tends to become incarcerated it should be repaired no matter what the age. In the usual case, however, incarceration seldom occurs and repair of the hernia may be safely postponed until the ureters have been transplanted. If there is a nondescent of the testes associated with the hernia it is even more important to postpone repair of this hernia until an older age when there is a better chance of success in bringing the testes down. Each case, however, must be decided on its own merits.

The usual methods of preoperative care for fluid balance must be observed. Postoperatively, one of the main objects is to acquire bowel control. In children old enough to understand, it is most helpful to put them on a regular bowel schedule during the day. This routine is started immediately after operation while the child is still on a Bradford frame. Every two hours and regularly, the

FIGURE 2. Intravenous pyelogram taken nineteen years after transplantation of the ureters. This patient, 40 years old at the time of this pyelogram, is the patient referred to in the text on whom transplantations were not done until she was 21 years of age.

child is offered the bedpan and encouraged to empty the rectum, even though he has no desire to do so. This routine is equally important when the child becomes ambulatory. Normal children at this age will wait until there is considerable urgency before emptying the bladder or the rectum. After the ureters have been transplanted, the rectal urgency may become acute and sudden. Therefore, it is well to accustom them to emptying the rectum at stated intervals, even though there is no immediate desire to do so. This time interval can be gradually lengthened and by school age it should not differ very much from the normal interval of early childhood.

Considerable difficulty is to be expected at night, at first. The child, especially if he is tired, may not awaken until after he has involuntarily emptied the rectum. The usual measures such as limitation of fluid and activity in the late afternoon and evening plus awakening him at 10 or 11 o'clock at night are useful procedures. As the child arrives at the age when he, himself, wishes to stay dry, the problem becomes simple, and in adult life presents no particular difficulties.

SEPARATION OF THE SYMPHYSIS

This seems like a very serious condition, especially when looking at the x-ray films. These patients often have a waddling gait, not unlike that of congenital dislocation of the hips. This is caused only in a small part by the bony separation of the pelvic girdle. Previous to operation and to urinary control, the child is so limited in his activities by the constant wetting that his muscles and ligaments are very underdeveloped from disuse. As soon as the child is able to stay dry he becomes normally active and the disturbance in gait becomes minimal or disappears. Even in the extreme cases, there is little noticeable limitation, particularly if some sort of supporting belt is worn.

To repair this bony abnormality at the symphysis would involve considerable interference with the vaginal outlet in the female and with the plastic repair of the epispadias in the male. In our series there has been no serious difficulty encountered in either sex as a result of this bony deformity. One patient's parents were Christian Scientists, and transplantation was not done until she was the legal age of 21. Even at that age there was no demonstrable infection of the ureters or kidneys. Since operation, the ureters have been in the rectosigmoid for twenty years and there is only minimal evidence in intravenous pyelograms of retrograde dilatation (Figure 2). She is married and has a child. Now at 42 years of age, there is a certain amount of relaxation of the pelvic floor and pelvic organs and she should probably have a hysterectomy, as there is no satisfactory way of suspending the uterus in her case. She has never complained of any discomfort she may have had as a result of the wide separation of the symphysis, and it has been completely compensated for by her normal existence.

The psychologic problem in the female need not cause any great concern as, if the operative steps are successful, great assurance can be given that the patient can lead a normal life physiologically and socially.

In the male there is a very considerable psychologic problem. These boys do everything they can to conceal from their playmates that they have to sit down to urinate. The external genitalia, even after repair, are abnormal in appearance and the boy is reluctant to appear in the shower room or to go swimming.

The psychologic problem is so great in the male that it is always worth considering the possibility of reconstruction of the bladder and its sphincter according to the methods suggested by Young. Such methods, even since the advent of antibiotics, will hold no great hopes of success unless the exstrophy of the bladder is minimal and the condition is perhaps better described as a complete epispadias. In such cases there may be some evidence that the bladder can function to some degree as a reservoir for the urine and there is a possibility that the bladder sphincter can be re-

paired. In the male, in suitable cases, it is certainly worth a trial and if successful, will permit the boy to void standing up and through the urethra. If this procedure is unsuccessful, transplantation may be resorted to later.

POSTOPERATIVE UROGRAPHY

It is well to remember that intravenous pyelograms made within the first few months after transplantation may show a considerable degree of dilatation of the ureters. In the absence of positive evidence of angulation or obstruction, this need not cause great concern, particularly if there are no clinical symptoms of pyelonephritis. It has been observed that after transplantation, the ureters lose a great deal of their normal peristalsis. This is presumably due to the trauma to the sympathetic nerve supply of the ureter itself.

There is good evidence to show that even a rather marked degree of dilatation of the ureters and kidneys disappears after a few months when, presumably, normal peristalsis is regained. If, however, there is definite evidence of constriction or angulation and clinical evidence of pyelonephritis, then the appearance of the intravenous pyelograms must be looked on with considerable concern and serious consideration should be given to exploration of the affected side with the possibility of re-implanting the ureter. Re-implantation has been done in 2 of our cases.

In summary, this distressing anomaly can be greatly relieved in both sexes by transplantation of the ureters; this should give adequate urinary control. In the female, after resecting the mucous membrane of the bladder and doing a plastic to the abdominal wall and labia, good assurance can be given of a good cosmetic result, of reasonable life expectancy, and also of ability to bear children.

The problem of the epispadias in the male is great, but by meeting this problem frankly and honestly as it arises, a great deal can be accomplished and a certain amount of assurance may be given that he will be able to have normal sexual relationships.

Treatment of Hordeola

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When hordeola are suspected the general practitioner is most frequently consulted. Therapy concerns not only treatment of the acute lesion but prevention of recurrences.

The immediate cause of hordeola are pathogenic staphylococci, organisms which have a predilection for the skin and glands of the lid margin. In hordeolum externum, the glands of Zeiss belonging to the follicles of the cilia are chiefly affected; occasionally the glands of Moll, the modified sweat glands along the lid edge. In hordeolum internum, the Meibomian glands are involved. The inflammation spreads from the interior of the gland into the adjoining connective tissue.

Hordeola, both internal and external, are frequently associated with chronic blepharitis marginalis and may precede or accompany the latter. Usually single, occasionally they conglomerate to a considerable extent. The degree to which the adjoining preauricular gland is swollen is an index to the severity of the infection. Though hereditary predisposition is evident, communicability to other individuals, as from husband to wife, seldom occurs.

USE OF BACITRACIN

Before the hordeola point a suitable routine is the removal of the cilia in the affected area followed by hot compresses and the instillation of bacitracin ointment every three to four hours. Bacitracin is nonirritating and is not inhibited by plasma, blood, pus, broken down tissue, or by organisms that produce penicillinase.

Bacitracin and penicillin have similar antibacterial powers but bacitracin is superior for local use as it does not produce contact dermatitis, is not inactivated by any bacteria, and is usually more effective against pathogenic staphylococci. The ointment is available in ophthalmic tubes with a bacitracin content of 500 units per gram. Bacitracin is highly soluble in water and so passes readily from the vehicle to the tissues.

No incision should be made until a spot of yellowish discoloration is visible. The severe pain that persists until the pus is evacuated can be alleviated by two tablets edrisal (aspirin, 5 gr.; amphetamine, 5 mg.) after breakfast and lunch, and aspirin, 5 gr. with phenobarbital ½ gr. after dinner and before retiring. If desired, the process

can be aborted by injecting into the center of the lesion 0.1 to 0.5 cc. of bacitracin solution (500 units per cc.) dissolved in 2 per cent procaine. These injections repeated daily for two or more times can be expected to cause resolution without incision.

This procedure is valuable when a hordeolum near the external canthus causes excessive pain and edema resulting from the compression of converging veins by the inflammatory process which may be slow in pointing. Premature incision in this area is dangerous as thrombophlebitis may follow with subsequent extension to the orbital veins causing orbital cellulitis and even cavernous sinus thrombosis. Sterile vials containing 2,000 units of bacitracin are marketed into which 4 cc. of 2 per cent procaine can be injected. At room temperature the aqueous solution will lose half or more of its activity in two weeks, but in the refrigerator the potency is maintained for over eight months.

INCISION

When the yellowish spot of an internal hordeolum is adjacent to the lid border the pus may be expressed through the orifice of the Meibomian duct by pressure of the lids between the thumb nails; but ordinarily the presence of a pointing spot indicates incision.

The patient will be less inclined to faint if placed supine on the examining table. A drop of adrenalin (1:1,000) followed by two drops of pontocaine 0.5 per cent at two-minute intervals is instilled in the conjunctival sac while the instruments are sterilized by boiling. A chalazion clamp applied to the involved area affords counterpressure for the incision, expresses the viscid pus, and gives the patient a sense of security. A narrow sharp scalpel, such as Bard-Parker 11, is used.

For hordeolum externum the incision is through the skin parallel to the fibers of the orbicularis muscle. **For hordeolum internum** the incision is through the conjunctiva at right angles to the lid border and parallel to the Meibomian glands. In incising near the inner canthus the lacrimal punctum and canaliculus must be carefully avoided. Ordinary infiltration anesthesia is contraindicated but the bacitracin-procaine solution can be used safely.

Following incision the bacitracin ointment and hot compresses are continued until the inflammatory reaction has completely subsided, after which the compresses are stopped but the use of the ointment should be extended for a week or longer to prevent further infection. At no time should an eye with an hordeolum be bandaged.

THE PROBLEM OF RECURRENCE

Recurrent hordeola are primarily due to the persistence of pathogenic staphylococci on the lid margin. Infection is favored by hyperemia, seborrhea, overactivity of the lid glands, and staphylococcus infections of the skin. Hyperemia may be due to lack of sleep, alcoholism, chronic conjunctivitis, and rubbing the lids because of itching. Seborrheic blepharitis, an extension of seborrhea of the scalp or seborrheic dermatitis, denudes the horny layer of the lid margin and thus renders it susceptible to infection. Excessive secretion of the Meibomian glands when present should be demonstrated to a member of the family by pressure of the lids between the thumb nails and this expression should be continued at home at regular intervals. Constant cleanliness is important in diminishing the number of skin staphylococci.

The diet should avoid both excessive intake of sugar and excessive fats as the former increases the susceptibility to staphylococcus infection and the latter stimulates hypersecretion of the lid glands.

Refractive errors, vitamin deficiency, and allergy are usually of minor importance. The presence of septic foci, anemia, diabetes, digestive disturbances, habitual constipation, and menstrual irregularities should be investigated.

Sulfonamides and antibiotics, even when given systemically, do not penetrate into the lid glands. In the effort to produce a specific resistance to staphylococcic exotoxin, staphylococcus toxoid has been administered. Though definitely superior to stock or autogenous staphylococcus vaccines, staphylococcus toxoid has achieved but limited success. A course of therapy takes three to four months and requires monthly maintenance doses if recurrences occur.

Autohemotherapy has also been used for recurrent hordeola and is worthy of trial. Blood taken from the patient's vein (10 cc.) is injected into his gluteal muscle. When thus given the blood has the property of foreign protein and possibly acts through stimulation of the reticulo-endothelial system. Only one or two injections, the second after an interval of a week or two, are considered necessary.

Case Report

Carcinoma in Fistula-In-Ano

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It is a paradoxical coincidence that carcinoma is so unusual in a region like the anus where other complaints are legion. Minor anal complaints are relatively commonplace in the practice of the general surgeon and proctologist. General appreciation that benign lesions of the anus may be of some significance in the production of malignant tumors does not exist. Fistula-in-ano itself has become endowed with a halo of respectability as far as carcinoma is concerned so that the complication of malignancy may easily be dismissed. The hiatus of time is not a prophylactic toward the development of carcinoma. The longer a fistula is present, the more strongly should the suspicion be aroused that a carcinoma is extant.

Fistula-in-ano usually develops at the dentate line, the separation between the upper and lower portions of the anal canal, where cylindrical cell gland-bearing epithelium and squamous epithelium are in contact. A malignancy may originate in either type of epithelium.

Rosser[3] reviewed the literature in 1934 and collected 11 cases of chronic fistula-in-ano complicated by malignancy, while David and Loring[1] reported 5 instances of the same condition. In 3 patients in this second series the fistulas were secondary to lymphogranuloma inguinale. In a recent review, Skir[4] collected 50 cases in which carcinoma presumably developed in anal fistula or in scars following operation for fistula or abscess. If a fistula has been present for a sufficient time to eliminate the presence of a slow growing carcinoma, it is reasonable to assume that the malignancy was induced by the chronic inflammation. Skir[4] has established a time limit of ten years for existence of the fistula-in-ano to be certain that the malignancy was not primary. He found that only 14 of his 50 collected cases satisfied this criterion and added 3 cases of his own.

Rosser[2] has offered three criteria to help assure the presence of fistula-in-ano complicated by carcinoma. First, the fistula should have existed long enough to exclude the reasonable possibility that the carcinoma antedated the fistula. Second, a tumor should not be present in the anal canal or rectum unless the neoplasm is definitely secondary. Third, the primary or internal opening should be in an anal crypt or ulcer and not in malignant tissue.

The most common type of malignancy reported complicating fistula-in-ano is the squamous cell carcinoma. Basal cell, mucoid, colloid, and adenocarcinomas have also been found.

Details of the following patient are reported to recall a usually forgotten serious complication of a benign condition. Radical procedures for benign fistulas are indicated not only for cure of the primary condition but also as a prophylactic for the rare case of carcinoma. The fact that the complication is infrequent in occurrence should not relegate it from mind.

CASE REPORT

A 57-year-old Negro male was admitted to this hospital in February 1947, with a massive ulcer involving both buttocks. In 1910 he had had a right perirectal abscess, which drained spontaneously. During the next two years, there were several recurrences of the abscess, which were followed by a persistent fistula-in-ano. In 1919 a left perirectal abscess, which opened spontaneously, was noted. This was associated with a fistula also for an unknown period. In 1933 he was admitted to a hospital with multiple fistulas. An indurated area with numerous fistulas, from which purulent material was draining, and which measured about 18 by 16 cm., was present on each buttock. Proctoscopic examination did not reveal internal openings in the rectum or anus.

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On December 30, 1933, an excision of multiple fistulas of the right buttock was performed and on January 17, 1934, a similar procedure was effected on the left buttock. The wounds on both buttocks needed grafting of skin which was done subsequently in two stages. Pathologic study revealed a chronically inflamed sinus with multiple fistula-in-ano. The fistulous tract on the right side healed but the tract on the left persisted, became ulcerated, and slowly increased in size.

On admission here, thirteen years later, a large, infected ulcer, involving the left buttock, was the basis of the chief complaint. Marked pain was noted in the anal area during defecation.

A huge, purulent ulcer, measuring about 16 by 12 cm., was found on the left buttock. The lesion surrounded about two-thirds of the anus which was markedly constricted. Numerous, small lymph nodes were present in both inguinal regions.

Proctoscopic examination did not reveal internal openings in the rectum or anus. Tumors were not visualized in the bowel.

The value for the hemoglobin was 82 per cent, the erythrocyte count 4,300,000 per cubic millimeter and the leukocyte count 12,000 per cubic millimeter. Urinalysis revealed albumin graded as one on a basis of four. The Kahn test was negative.

Roentgenograms of the chest and thoracolumbar vertebrae were normal. The roentgenograms of the colon following administration of a barium enema did not reveal pathology above the constricted anus.

Biopsy of the ulcer of the buttock revealed a well differentiated squamous cell carcinoma. Biopsy of the lymph nodes in the inguinal areas bilaterally and subsequent exploratory laparotomy did not reveal metastasis. A colostomy in the sigmoid portion of the colon was done. This procedure was followed later by a posterior resection of the rectum and anus and an excision of the ulcer on both buttocks. The wound healed very slowly and an indolent ulcer, measuring about 4 cm. in diameter, remained. This area was again widely excised. Pathologic study revealed carcinoma in the central portion of the ulcer. A split-thickness skin graft was later applied. The wound healed completely eventually. The patient was discharged from the hospital.

The specimen removed at the time of posterior resection measured about 16 by 18 cm. The margin of the ulcer was raised, scarred, and firm and the base of the ulcer was formed by granular grayish-white granulation tissue. The anus at one margin was involved by neoplasm but the remaining rectum was normal. Microscopically, the tumor was composed of well differentiated squamous cells which infiltrated a short distance into the tissue and was everywhere circumscribed. Cytoplasmic keratin and epithelial pearl formations were abundant. The connective tissue about the tumor was heavily infiltrated with plasma cells, lymphocytes, and eosinophils. The diagnosis was established as squamous cell carcinoma.

Several communications to the patient went unanswered. About six months after discharge, the patient was readmitted to the hospital in a state of emaciation, with a large recurrence of the lesion. He was semistuporous, and a coordinated history could not be obtained. He did state that the lesion had recurred recently and had rapidly become enlarged.

Evidence of weight loss was marked and pallor was severe. An ulcerated, fungating lesion, measuring 14 by 18 cm., involving the buttock, scrotum, and the penis, was present.

Biopsy revealed a squamous cell carcinoma similar to the previous lesion. The roentgenograms of the chest, pelvis, and spine were negative for evidence of metastatic lesions. However, the condition of the patient was such as to prohibit further surgery. The patient subsequently died from the malignant process.

REFERENCES

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2. Rosser, C.: The etiology of anal cancer. Am. J. Surg. 11:328-333 (February) 1931.
3. Rosser, C.: The relation of fistula-in-ano to cancer of the anal canal. Tr. Am. Proct. Soc. 35:36-67, 1934.
4. Skir, I.: Mucinous carcinoma associated with fistulas of long standing. Am. J. Surg. 75:285-289 (February) 1948.

The Medical Bookman

MEDICINE THROUGHOUT ANTIQUITY*

MEDICINE THROUGHOUT ANTIQUITY" is a mature work covering the large span from prehistoric periods through the history of all ancient civilizations up to the fall of Rome. It is divided into two parts; the first is devoted to prehistoric and protohistoric medicine, while the second deals with the Graeco-Roman period. Dr. Max Neuburger rightly points out in the foreword that in many histories of medicine the treatment of prehistoric medicine and that of the ancient oriental countries is usually very sketchy, while most of the space is devoted to Graeco-Roman medicine; since more than half of this book is taken up with these earlier phases, it is particularly valuable for the student of ancient medicine.

The writer presents a very exhaustive study of prehistoric and primitive medicine in a space of 157 pages (The Antiquity of Medicine, Paleolithic Evidence of the Antiquity of Medicine, Prehistoric Medicine, Primitive Concepts of Disease and Death, Nature Worship and Medicine). To have a thorough knowledge of our ancestors no doubt is helpful in understanding how the concept of diseases, their causes and treatment, gradually developed, but the writer's enthusiasm drives him almost too far afield as he gives us a fairly complete essay on anthropology. Although not always directly connected with medicine, even in its wider sense, one must admit that these chapters make interesting reading.

The chapters on Medicine in Assyro-Babylonia and in Egypt are rich in material and most interestingly presented. Considerable space is given to cultural and religious backgrounds, since they are closely connected with medical thought in these ancient countries. The student of ancient medicine will notice with pleasure the space given to the scientists who have done pioneer work in opening to us the secrets of medical lore from the ancient literature and from investigations on human remains. The former sources teach us about ancient knowledge of medicine, while the latter actually reveal the nature of some of the diseases to which the ancients were subject, and at times they show what the ancient physician tried to do to relieve the patient's agony or to save his life.

One of the best chapters is that on ancient Hebrew Medicine. The author has a happy way of grouping his material under many headings, such as disease as sequel to sin, treatment of disease, social hygiene, Moses, King Solomon, Babylonian influence, Hellenic influence. More extensive portions are devoted to Biblical anatomy, Biblical physiology, and on hygiene in the Bible; and there are chapters on diseases of the Hebrews, materia medica, cutaneous diseases, penetrating wounds, infections of bones, intestinal parasites, surgery, eye diseases, functions of the heart, insanity, obstetrics and gynecology, therapeutics, death.

We learn of the influence of neighboring nations on Biblical medicine, medicine in the Apoerypha and the Pseudepigrapha, and of the Essenes and the therapeutae, medicine in the new testament, and Phoenician medicine. These subtitles are enumerated for the purpose of showing the thoroughness and comprehensiveness with which the history of Hebrew Medicine is presented.

We are told in the preface that most of the chapter on ancient Hebrew Medicine comes from the pen of Dr. Gordon's youngest son, Dr. Morris B. Gordon; it should contribute much to the understanding of this important phase of medical history, as no exhaustive work in the English language dealing with it is available. Many a medical historian felt the lack of a good translation of the excellent work of Julius Preuss. The authors of the present work no doubt made much use of this classic in the preparation of this chapter and those on Talmudic medicine. Thus it seems almost irreverent to ignore completely this fine historian (with the exception of giving him credit for one reference).

Very valuable material is to be found in the chapters on ancient Persian, Indian, Chinese and Japanese medicine and on medicine among the prehistoric Amerinds.

Greek, Alexandrian, and Roman medicine are thoroughly described from the earliest periods, through the various schools of medical thought, up to the fall of Rome in 479 A D. This vast mate-

*Medicine Throughout Antiquity. By Benjamin Lee Gordon, M.D. Foreword by Dr. Max Neuburger. 840 pages, 157 illustrations. 1949, F. A. Davis Company, Philadelphia. $6.00.

FIGURE 141. A chest bandage. This chest bandage was devised by the celebrated surgeon Soranus (98-138 A.D.). Soranus was a student of Alexandria who practiced in Rome. His is the most reliable biography of Hippocrates. Soranus was a Methodist, but he felt free to choose any system of medicine when he found it to the interest of his patient.

(From: "Medicine Throughout Antiquity.")

rial is admirably presented. In clear language, the author discusses the many schools of philosophical thought which so greatly influenced ancient medicine. Although much literature is available on these phases of ancient medicine, the excellent presentation should make their study much easier.

The last two chapters deal with Talmudic medicine. As with the chapter on ancient Hebrew medicine, many readers will be grateful for this material in extensive and critical form.

For the author, this work is no new venture into the field of history of medicine, but it is his opus magnum of which he can justly be very proud. "Medicine Throughout Antiquity" is a fine addition to the armamentarium of the medicohistorian, student as well as teacher. The author himself states that he "sought to supplement rather than parallel other texts." He has made use of most available researches that shed new light on the various phases of ancient medicine and their relation to modern medicine, and he frequently includes extensive translations from original sources. The originality of the organization has been pointed out. There is a good index, and there are many references and notes following each chapter.

This work constitutes a textbook on the vast era of antiquity, and as such it should contain a more systematic bibliography of important works for the various periods. Although the reviewer cannot always agree with the writer (e.g, that rachitis was common in ancient Egypt) this is not meant as a criticism. It is annoying, however, to find so many German references misspelled. One hundred fifty-seven illustrations would seem to be an adequate number, but not all are directly connected with medicine, and the inclusion of a number of purely fantastic portraits (e.g., Machaon and Podalirius) cheapen this otherwise thorough history of ancient medicine. All in all it is a most satisfying volume, well printed, and dignified in appearance.

R. R.

New Books Received

► CLINICAL AUDIOLOGY - - -

By Maurice Saltzman, M.D., Assistant Professor of Otorhinology, Temple University School of Medicine; Associate Otolaryngologist, Mt. Sinai Hospital, Philadelphia. 195 pages, illustrated. 1949, Grune & Stratton, New York. $5.00.

The purpose of this book is to interpret otologic observations from the viewpoints of psychophysics and psychophysiology. Representative graphs have been set up as "patterns" to cover various otologic conditions.

The first two chapters deal with sound and noise, hearing and deafness. Chapters four and five describe hearing tests and hearing aids. In general the author has covered his subject fully, and as simply as the rather complicated anatomy and physiology of the ear allow.

One sometimes fails to emphasize that we hear

with the brain, and that all other elements are essentially secondary, being means to an end. For example, we often see a type of inattention deafness where an individual asks for a repetition so that he may have time to formulate a reply. Slow cerebration is a not infrequent cause in the ill and the aged. No "aid" can correct such deafness, and yet this fact has not received due recognition in the literature. We do not find it in this book either. Nevertheless, the science of audiology is in general comprehensively considered by the author who is to be commended for the intensity and scope of his observations.

I. W. V.

► SURGICAL MANAGEMENT OF VASCULAR DISEASES - - -

By Gerald H. Pratt, M.D., F.A.C.S., Associate Clinical Professor of Surgery, New York University, Chief of the Vascular Clinic and Associate Attending Surgeon, Saint Vincent's Hospital; Attending Surgeon, St. Clair Hospital, New York; Commander, Medical Corps, U.S. Naval Reserve. 496 pages, with 181 illustrations and 2 plates in color. 1949, Lea & Febiger, Philadelphia. $10.00.

This text is a very timely one as the specialty, vascular surgery, is rapidly making strides and expanding. Functional and organic diseases of the arterial and venous systems are discussed from the standpoint of etiology, symptoms, pathology, and treatment.

The text is divided into five principal sections as follows: (1) nomenclature and case history; (2) the arterial system, covering occlusive arterial diseases, amputations, vasospastic syndromes, arterial injury, fistula, aneurysms, embolisms, thrombosis, cervical rib, sympathectomy and hypertension; (3) the venous system including varicose veins, anticoagulant therapy, thrombophlebitis and the postthrombotic syndrome; (4) the lymphatic system, and (5) surgery of the heart, including patent ductus, coarctation, pulmonary stenosis, and anomalies of the aortic arch. It also deals with surgery in coronary occlusion and heart wounds.

Section 6 discusses special technics such as angiography and cardiovascular catheterization, skin grafting, management of vascular ulcers, esophageal varices, and the relationship of vascular disease and trauma.

This book presents the essence of the literature of the past five years except for outstanding contributions made before that time. The management of many vascular disorders is still open to question, and in these cases Dr. Pratt has recorded the present consensus together with his own opinions and results.

N. B. B.

► THE DIAGNOSIS OF PANCREATIC DISEASE - - -

By Louis Bauman, M.D., Former Assistant Professor of Clinical Medicine, Columbia University, and Assistant Visiting Physician to the Presbyterian Hospital, New York. 74 pages, with 24 tables and 12 figures. 1949, J. B. Lippincott Company, Philadelphia. $5.00.

One of the most obscure, although most important organs of the body is the pancreas. This monograph, therefore, is timely and certainly welcome in delineating the reliability of present known methods for the study of pancreatic function.

The major portion of the monograph is devoted to a consideration of the pancreatic function test. The technic of the recovery of the pancreatic ferments following vagus stimulation with mecholyl is described and the use of the results in diagnosis of various pathologic states mentioned. For example, in differentiating carcinoma of the bile ducts from carcinoma of the head of the pancreas, the author reports that in 83 per cent of 18 cases of the former the pancreatic juice was abnormal while in only 10 per cent of 22 cases of the latter was it abnormal.

Part 2 is devoted to a two-page discussion of fat absorption studies in pancreatic deficiency. This seeming neglect stems from the author's observation that in these patients the results of fat balance studies have been surprisingly variable. Nevertheless, he states definitely that in the nonicteric patient, studies of fat absorption are of diagnostic value in pancreatic disease.

Part 3 is an exceptionally fine section covering the topic of serum amylase. Following a detailed explanation of the laboratory technic for determining serum amylase, the author considers his result in several series of pathologic states. He concludes by a summation in which he mentions the conditions in which determination of this enzyme is an aid to diagnosis.

N. S.

► OPERATIVE TECHNIC IN SPECIALTY SURGERY - - -

Edited by Warren H. Cole, M.D., Professor and Head of Department of Surgery, University of Illinois College of Medicine; Director of Surgical Service, Illinois Research and Educational Hospitals, Chicago. 725 pages, illustrated. 1949, Appleton-Century-Crofts, Inc., New York. $14.00.

This text is the companion volume to "Technic In General Surgery" (reviewed in *Postgraduate Medicine,* November 1949), and here again Dr. Cole has done an admirable job in selecting authors who are active in the surgical specialties.

Opening sections deal with the subjects of plastic surgery and the thoracic wall, pleural cavity, and diaphragmatic hernia, and include much that is of value to specialists and general surgeons alike.

The chapter on heart and mediastinum is a truly new presentation and is indeed something not found in other texts. It includes discussion of wounds of the heart, foreign bodies, pericarditis, scars on the heart, tumors of the heart, revascularization of the heart, and surgical correction of certain congenital defects. Another chapter that contains much not found elsewhere is the one on surgical approaches to the joints.

Other sections are directed to fractures, osteomyelitis, deformities and neoplasms of bone, spastic paralyses and poliomyelitis, neurosurgery, and gynecologic and urologic surgery.

This book can be considered a series of monographs, each written by one or more specialists who have devoted time and effort to research in their particular fields and who have herein presented much that is not "standard textbook material."

Y. S.

► THE 1949 YEAR BOOK OF MEDICINE - - -

Edited by Paul B. Beeson, M.D.; J. Burns Amberson, M.D.; George R. Minot, M.D., S.D., F.R.C.P. (Edinburgh & London); William B. Castle, M.D., S.M. (Hon.) Yale M.D. (Hon.) Utrecht; Tinsley R. Harrison, M.D., and George B. Eusterman, M.D. 831 pages, illustrated. 1949, The Year Book Publishers, Chicago. $4.50.

In conformity with the procedure of previous years, the 1949 Year Book of Medicine is divided into several specialty sections: (1) Infections—Paul B. Beeson, M.D.; (2) The Chest—J. Burns Amberson, M.D.; (3) The Blood and Blood-forming Organs and the Kidney—George R. Minot, M.D., and William B. Castle, M.D.; (4) The Heart and Blood Vessels—Tinsley R. Harrison, M.D.; (5) The Digestive System—George B. Eusterman, M.D. These authors cover the current literature in great detail from July, 1948, to May, 1949.

The "Year Book Quiz," in twenty well chosen questions, serves to illustrate how important it is for any practicing or teaching doctor of medicine to supplement his year-round reading by perusal of this year book. What finding following appendectomy permits prediction of measles? Why is oral or parenteral iron therapy of no value in anemia of infections? What is probably the commonest arrhythmia in patients with atrial septal defects? For the answers to these and hundreds of other questions you are referred to this excellent volume.

E. C.

► VISION; ITS DEVELOPMENT IN INFANT AND CHILD - - -

By Arnold Gesell, M.D., Frances L. Ilg, M.D., and Glenna E. Bullis; assisted by Vivienne Ilg, O.D., and G. N. Getman, O.D. 329 pages, with 72 figures. 1949, Paul B. Hoeber, Inc., New York. $6.50.

Drawing upon their experience at the Yale Clinic of Child Development, the authors attempt, in this book, to correlate the growth of the visual functions in relation to total development of the child.

The text is divided into three parts, the first of which is devoted to detailed observations of the activities of children from the neonate period (first postnatal month) through the age of 10. This section is profusely illustrated with pictures of children in standardized situations and during casual activity.

A goodly portion of the book is devoted to objective determinations of visual function by the use of the retinoscope. Although the authors warn that the findings call for cautious interpretation they describe in detail variations in the intensity of the fundus reflex and momentary changes of the movement of the reflex (i.e., *with* and *against*) while

the examiner is seated at far, intermediate, and near distances and the subject is viewing an object at the far distance. For children of 2 years and older these observations are further elaborated by having the children regard a book at near distance. One wonders at the significance of these findings, which depend both upon the cooperation of infants and children and upon the subjective evaluations of the observer, in eyes in which both the pupillary responses and the accommodation are freely active.

In the chapter on maldevelopment and child vision the authors describe the pallor of the optic disks in a child of four months with cerebral injury, overlooking the fact that the disks in infants are pale normally.

In the 5- to 10-year group the authors measure the amplitude of divergence and then immediately measure that of convergence, overlooking the fact that such a procedure results in an abnormally low value for the latter.

When the authors limit themselves to observations of the activities of the child at various age levels the book is excellent; when they attempt to measure visual activities the book falls short of this standard.

P. B. J.

Books received will be acknowledged in this department each month. As space permits, books of principal interest to our readers will be reviewed more extensively.

The Arthropathies; A Handbook of Roentgen Diagnosis. By Alfred A. de Lorimier, M.D., Radiologist, Saint Francis Hospital, San Francisco; Consultant in Radiology for the United States Army at Letterman General Hospital; formerly Commandant, The Army School of Roentgenology. Ed. 2. 335 pages, illustrated. 1949, The Year Book Publishers, Chicago. $7.00.

Handbook of Medical Management. By Milton Chatton, A.B., M.D., Instructor in Medicine, University of California Medical School, San Francisco; Sheldon Margen, A.B., M.D., Clinical Instructor in Medicine and Research Associate in Medicine, University of California Medical School, San Francisco; and Henry D. Brainerd, A.B., M.D., Assistant Clinical Professor of Medicine and Pediatrics, University of California Medical School, San Francisco; Assistant Clinical Professor of Pediatrics, Stanford University School of Medicine; Physician in Charge, Isolation Division, San Francisco Hospital. First Edition. 476 pages. 1949, University Medical Publishers, Palo Alto, California. $3.00.

Diseases of the Heart. By Charles K. Friedberg, M.D., Associate Physician, Mt. Sinai Hospital, New York; Lecturer in Medicine, Columbia University. 1081 pages with 79 figures. 1949, W. B. Saunders Company, Philadelphia & London. $11.50.

The Sexual Criminal; a Psychoanalytic Study. By J. Paul de River, Criminal Psychiatrist and Sexologist, Los Angeles Police Department; Consultant Alienist to the Superior Courts, City and County of Los Angeles, Founder and Director of the Sex Offense Bureau, City of Los Angeles. 281 pages. 1949, Charles C Thomas, Springfield, Illinois. $5.50.

From the Hills; An Autobiography of a Pediatrician. By John Zahorsky, M.D. 388 pages. 1949, The C. V. Mosby Company, St. Louis. $4.00.

Helpful Hints to the Diabetic. By William S. Collens, B.S., M.D., Chief of the Diabetic Clinic; Chief of the Clinic for Peripheral Vascular Diseases; Associate Attending Physician, Maimonides Hospital, Brooklyn; and Louis C. Boas, A.B., M.D., Chief of the Diabetic Clinic; Associate Visiting Physician, Greenpoint Hospital, Brooklyn, New York. 135 pages, illustrated. 1949, Charles C Thomas, Springfield, Illinois. $3.00.

Malariology; A Comprehensive Survey of All Aspects of This Group of Diseases from a Global Standpoint. By 65 contributors; edited by Mark F. Boyd, M.D., M.S., M.P.H., Formerly of Field Staff, International Health Division, Rockefeller Foundation; Director of the Station for Malaria Research. Volumes I and II, pp. 1 through 1,643; figures 1 through 436. 1949, W. B. Saunders Company, Philadelphia & London. $35.00.

Physiology of Heat Regulation and The Science of Clothing. Edited by L. H. Newburgh, M.D., Professor of Clinical Investigation, The Medical School, University of Michigan. 457 pages, illustrated. 1949, W. B. Saunders Company, Philadelphia & London. $7.50.

Recent Advances in Physiology. By W. H. Newton, M.D., M.Sc. (Manch.), D.Sc. (Lond.), Professor of Physiology in the University of Edinburgh. Ed. 7. 269 pages, with 90 illustrations and 32 tables. 1949, The Blakiston Company, Philadelphia & Toronto. $4.50.

Resuscitation and Anesthesia for Wounded Men. By Henry K. Beecher, M.D., Henry I. Dorr Professor of Research in Anesthesia, Harvard University; Chief, Department of Anesthesia, the Massachusetts General Hospital; Formerly Lieutenant Colonel, Medical Corps, U.S. Army. 161 pages, illustrated. 1949, Charles C Thomas, Springfield, Illinois. $5.50.

Essentials of Obstetrical and Gynecological Pathology. By Robert L. Faulkner, M.D., F.A.C.S., Assistant Professor of Gynecology, The Western Reserve Medical School; Associate Gynecologist, University Hospitals of Cleveland, Ohio; and Marion Douglass, M.D., Formerly Assistant Professor of Gynecology, The Western Reserve Medical School. Ed. 2. 357 pages, with 300 illustrations, including 3 color plates. 1949, The C. V. Mosby Company, St. Louis. $8.75.

Principles and Practice of Therapeutic Exercises. By Hans Kraus, M.D., Assistant Clinical Professor of Rehabilitation and Physical Medicine, New York University College of Medicine; Physician-in-Charge of Therapeutic Exercise, Institute of Rehabilitation and Physical Medicine, New York University-Bellevue Medical Center. Illustrations by Richard Kroth. 309 pages. 1949, Charles C Thomas, Springfield, Illinois. $6.50.

Intestinal Intubation. By Meyer O. Cantor, M.S., M.D., F.A.C.S., Assistant Attending Surgeon, Grace Hospital; Formerly Senior Attending Physician, Deaconess Hospital, Detroit, Michigan. 333 pages, with 138 illustrations. 1949, Charles C Thomas, Springfield, Illinois. $7.50.

The 1949 Year Book of Pediatrics. Edited by Henry G. Poncher, M.D., Professor and Head, Department of Pediatrics, College of Medicine, University of Illinois; with the collaboration of Julius B. Richmond, M.D., Associate Professor, Department of Pediatrics, College of Medicine, University of Illinois; Isaac A. Abt, M.D., Editor Emeritus. 560 pages, illustrated. 1949, The Year Book Publishers, Inc., Chicago. $4.50.

EDITORIALS

Postgraduate Medicine
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FEDERATED FUND RAISING

Here and there during the past twelve months newspapers and magazines have been editorializing about federated fund raising. Articles have appeared in such popular magazines as the *American* and *Reader's Digest*. The chief excitement has centered around Detroit where, under the leadership of Henry Ford II, a single collection has been made to cover contributions to a wide variety of foundations and philanthropies. The people, one of the articles said, are tired of giving. Frequent drives by such agencies as the Red Cross, the American Heart Association, the American Cancer Society, and the National Foundation for Infantile Paralysis, are said to exhaust the patience of large and small givers alike. "Why not stop all of these drives," one of the articles asked, "and have instead one big organized collection every year, from which allocation may be made to all the agencies that seek help in the community?" Already the excitement in Detroit has reached Milwaukee and even as far west as Omaha.

The proposal to eliminate drives for gifts to the medical, charitable and similar organized philanthropies is inextricably bound with the whole problem of the "welfare" state. The same argument may be applied here as is used in relation to planning against the costs of medical services. If private initiative is unable or unwilling to solve the problem of unsatisfied needs related to health and life, GOVERNMENT must assure the people certain minimum levels of food, fuel, clothing, shelter, and medical care.

In a recent address on this subject Mr. Basil O'Connor said: "If the people themselves take their proper place in the field of health, welfare, and humanitarian activities, they need not rely on government for the solution of their problems."

In other countries of the world, in which governments assume the functions developed by our great foundations and philanthropies in the United States, there are no such agencies. In no other country, incidentally, are the problems of poliomyelitis, cancer, relief in disaster, and similar difficulties, so completely met as in the United States. Here has been applied the genius for organization that prevails in the United States. The very effectiveness of these voluntary groups makes one wonder how much less efficiently these needs might be served, if the hearts and warm sympathies of those who devote themselves to these causes were to be replaced by the automatic coldness of the bureaucracies.

A pattern for activity has developed in the agencies concerned with poliomyelitis, the heart, cancer, tuberculosis, and the care of the crippled. Great public leaders enlist their brains and their own funds in the campaigns against evils with which they have been personally concerned. They guide the campaigns for funds, and they assume the responsibility of caring for such funds as accumulate. They accept guidance from competent leaders in the field of medical science in the allocation of funds for research, for education of the public and medical profession, and for the care of the sick. Their effectiveness is attested to by the fact that most of our people no longer fear these menaces to health and life. People give their confidence to these great organizations, recognizing that they will do the most that can be done to combat the threats of disease and death against which they are arrayed.

Are the people really tired of giving? Of course not! They meet the goals established by those who study the situation and determine the needs. In the field of infantile paralysis particularly the people have shown their earnestness and their sincere belief in the pattern of organization against disease and of care for those in need. In 1949 the number of cases of this most feared of all visibly crippling disorders reached 42,375. Everywhere within our nation the long arm of this beneficence reached out to provide hospitalization, specialistic care, nursing and physical therapy services, such as are not available anywhere else in the world. No government known, and that includes the government of the United States, provides or even thinks of providing what this foundation supplies to those with poliomyelitis in our country. And continuously, day after day, scientific workers are stimulated to search for the specific viruses, specific means of prevention, new technics in the care of the crippled, which when achieved will eliminate the need for the National Foundation for Infantile Paralysis.

What has been said about poliomyelitis could be said with equal justice and acclaim about cancer and the diseases of the heart and the organizations that lead in the attack against them. The American people are not tired of giving to such efforts; rather do they glory in what has been accomplished and pray Godspeed for even greater achievements in the future.

MORRIS FISHBEIN, M.D.

OPERATING ROOM VISIBILITY

Good lighting in the operating room ranks high among the factors contributing to the success of an operation. One of the basic principles in surgery is good exposure, and good exposure is necessarily limited by and cannot be obtained without good illumination. Light which barely enables a surgeon and his assistants to see is not enough. Such illumination is conducive to eye strain, fatigue and inaccuracy. Poor visibility undoubtedly shortens the effectual professional life of a surgeon and his assistants.

Industry in general has taken advantage of the present knowledge of scientific illumination. This resulted from the necessity for increased production during war years. It was found that production increased as much as 200 per cent, and errors diminished almost immediately after the installation of adequate illumination.

Illumination in most operating rooms is inferior to the accepted standards for comparable tasks in industry. The following values are representative of actual conditions in operating rooms of several large hospitals in this country: general artificial illumination, 5 to 25 foot candles; natural illumination from windows and skylights, 0 to 10,000 foot candles (depending principally upon the weather, seasons and time of day); local artificial illumination from multibeam lights, 200 to 600 foot candles.

For industrial tasks, such as engraving, watchmaking and fine machine tool work, general illumination of 100 to 500 foot candles is used and supplementary local lighting up to 3,000 foot candles provided.

Because of the extreme variation, daylight has been supplanted by artificial light for precision manufacturing.

The visibility of any object depends upon four interdependent factors: the size of its critical details, its contrast with its immediate background, the brightness of the entire task and surroundings, and the time the image of the object rests upon the retina of the eye. Since complementary relationships exist among these factors, a deficiency in one factor, within certain limits, may be compensated by augmentation of one or more of the other factors.

In the usual red operating field the contrasts between threshold-sized visual objects and their backgrounds are indeed very low. To see these low-threshold objects, it becomes necessary either to increase the intensity and quality of illumination or to increase the fixation time of the eyes on the object. The time saved by improving illumination in a given visual act may be only a fraction of a second; the saving of a fraction of a second many times during the course of an operation may be very considerable.

In any lighting problem the reflecting qualities of the surface illuminated must be considered. It is well established that brightness contrast is desirable in the visual task itself. It is less obvious, but well established, that brightness contrasts between the visual task and its surroundings are decidedly undesirable. It has been shown by Dr. Mathew Lucheish, Director of Lighting Research for General Electric Company, that visibility of small objects is reduced as much as 40 per cent when the brightness of the surroundings is five times that of the visual task. In operating rooms using bleached white "linen" (over 90 per cent reflectance factor), the ratio of brightness of surroundings to that of the red visual task is in excess of five to one. By substituting colored drapes of proper shade the reflectance of wound and surroundings can be made nearly equal.

The highly polished chrome-plated or stainless steel instruments and retractors now in use produce specular (mirror-like) reflections that have an undesirable blinding effect. Unpolished or machined metal surfaces are spread or diffuse reflectors and produce little, if any, specular reflection.

SPECIFIC RECOMMENDATIONS

1. Provide at least 500 foot candles of general illumination by the use of a luminous ceiling consisting of multiple rows of fluorescent tubes covered with diffusing lucite panels.
2. Provide at least 3,000 foot candles of local illumination from a luminaire with a single large reflector, preferably with the direction of its beam under the direct control of the surgeon.
3. Provide a pleasing shade of gray or green "linen" having a reflectance factor of 25 to 30 per cent.
4. Use unpolished, satin-finished, chromium-plated instruments.
2. Walls and floor should have a nonglossy, light gray or green finish with a reflectance factor of approximately 50 per cent.

While each of the five recommended improvements has been used individually, optimum visibility results only from their simultaneous application.

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YALE EXHIBIT ON HISTORY OF POLIOMYELITIS

The beginnings of poliomyelitis are shrouded in the undiscovered records of antiquity. Recently an exhibit on the history of the disease was set up in the library of Yale University School of Medicine. Apparently the descriptions of early cases of deformities which might have resulted from infantile paralysis appeared in ancient Egypt. The mummy of the Egyptian king Siptah, which is in the Cairo Museum, reveals such a paralysis. Another description concerned a lame doorkeeper of an early Egyptian temple.

While these two cases of deformity are generally considered to represent the results of poliomyelitis, some doubt naturally prevails as to the possibility of other causes of the deformity.

The Yale exhibit included also the first Greek edition of Hippocrates, dated 1526, in which there is mention of an epidemic of paraplegia in Thossos.

The "Bibliography of Poliomyelitis," published by the National Foundation for Infantile Paralysis, begins with the first accurate clinical description of the disease. The description was written by Michael Underwood, a British physician, in the second edition of his "Treatise on the Diseases of Children," published in London in 1789. Sir Walter Scott, famous British novelist, who tells of the origin of his lameness in his autobiography, also provided an early clinical description of the disease. A classical treatise on the subject is the article by Jacob von Heine in 1840. Heine clearly differentiated poliomyelitis from other types of paralysis and suggested that the symptoms "point to an affection of the central nervous system, namely of the cord of an irritative and congestive sort." Then in 184, Oscar Medin observed an epidemic of 44 cases in Stockholm which he reported in 1890. The important presentations by Heine and Medin led eventually to the use of the eponym "Heine-Medin disease."

The exhibit in the Yale Medical Library might well be duplicated in other medical schools; such exhibits make much more graphic to the medical student the step-by-step progress which is, in the vast majority of instances, the rule in the advancement of medical knowledge.

MORRIS FISHBEIN, M.D.

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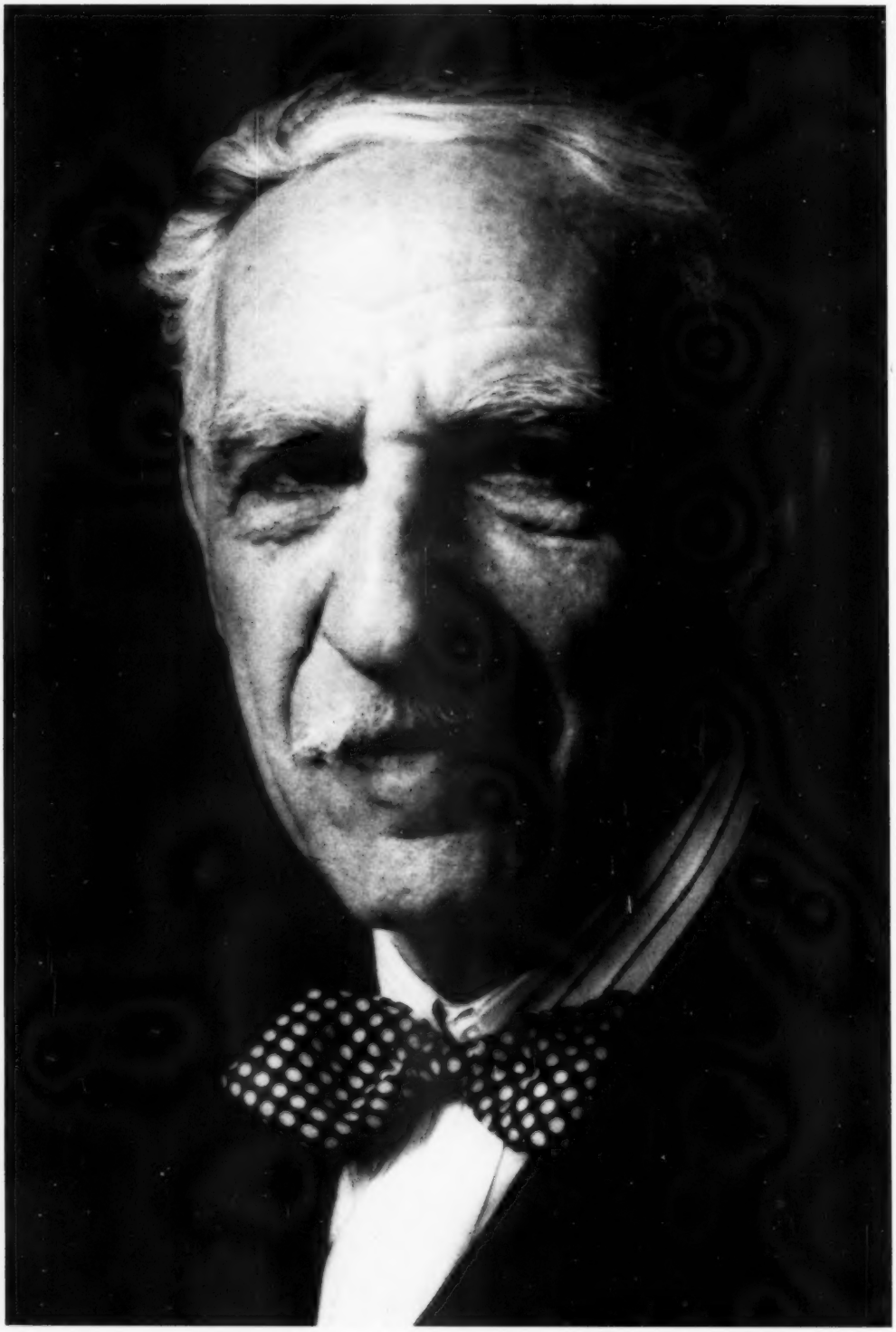


"You either like children or you don't."

Men of Medicine

In his fifty-one years as a physician, New York's Dr. Sidney V. Haas has treated between 75,000 and 100,000 children, in clinics or in private practice. But he still remembers one little girl he treated thirty years ago. The famed pediatrician was then medical head of the Home for Hebrew Infants in New York. The girl, two and a half years old, had just graduated from the "high chair ward" to the "run-about ward" when she became ill with celiac disease. Dr. Haas, in describing celiac victims, explains: "These children never smile." Since the girl had developed anorexia nervosa, a common complication of celiac disease, she could not eat, and so was in danger of starving to death.

Dr. Haas, who always keeps his blue eyes open to what is going on around him, started checking the foods that other doctors had given her in an attempt to make her eat. One of the foods that doctors had not tried was bananas. He thought, "why not try them?" The first time doctors forced a spoonful of ripe banana between her lips, she spat it out; but then she licked her lips. The next spoonful she swallowed with a pleased expression, and soon she was able to eat other food. Later, when she relapsed, Dr. Haas asked what had happened. Told that the hospital had run out of bananas, he saw that the hospital got some more. Fed on bananas, the little girl got well and stayed well.

That was the beginning of the banana treatment for celiac disease, now standard procedure. Dr. Haas tried bananas on other children with the same nutritional ailment, and the treatment worked. He published his findings in an epoch-making report to the *American Journal of Diseases of Children* in 1924. Sure of his results, he wanted to call the paper "The Curative Value of the Banana in the Treatment of Celiac Disease," but the magazine's publishers, the American Medical Association, were skeptical and played it safe by leaving out the adjective "curative." Until then there had been no satisfactory treatment for celiac disease, which Dr. Haas calls "probably the most troublesome disturbance of nutrition in late infancy and early childhood." Then, mortality was between 15 and 20 per cent. Now, thanks to the banana treatment, mortality is "negligible."

Just how the bananas work to effect a cure is still not definitely known. One thing about it seems certain. Children with celiac disease cannot utilize carbohydrates; they utilize fats fairly well, and proteins normally. No other fruit contains such amounts of carbohydrates as bananas, and its sugars are monosaccharides, whose reaction in the body is different from that of disaccharides and polysaccharides. Bananas, thinks Dr. Haas, furnish a type of carbohydrate that can be used by a patient with celiac disease while the body somehow cures itself.

Dr. Haas, still in active practice at 79, has developed his own theory of the way bananas work their cure; it is, he admits, a "wild hypothesis." He thinks that the baffling disease may be due to an organism in the intestinal tract, perhaps a bacterium, that needs a certain medium in which to grow. If it is deprived of that medium, it dies. Certainly, other bacteria will grow only in certain media and not in others. By taking away the usual carbohydrates, the hypothetical "celiac bacteria" might be starved out, while the body supports itself on the carbohydrates from bananas, a type of carbohydrate that the "celiac bacteria" for some reason cannot use.

Bananas, as Dr. Haas is anxious to make clear, are not a specific for celiac disease. It is not enough just to add them to the diet and let the sick child eat anything else; bananas are not antibiotics. As long as other nonfruit carbohydrates are being eaten, bananas by themselves do no good. The important thing is to exclude any form of carbohydrate except that from other fruits like dates. The patient must avoid all bread, cereals, etc.; even a bit of toast may be enough to cause a relapse in a little patient who was getting along well on bananas. The all-essential bananas should be ripe, with mottled skin. Red bananas are not quite so good, but they "could do in a pinch." Banana powder is fine, and Dr. Haas uses it as much as possible,

←

DR. SIDNEY V. HAAS
(Photo by Hilda Reis)

although it has been scarce since the war. In fact, Dr. Haas was responsible for introducing banana powder; twenty years ago he interested a chemist and an engineer in the technically difficult job of making the first commercial banana powder.

Dr. Haas' second famous treatment came from keeping his eyes open, too. While he was interning at New York's Mt. Sinai Hospital he saw many cases of painter's colic, a form of lead poisoning. The painters were brought in bent over in agony. Staff physicians gave them atropine, or belladonna, to make them more comfortable; the atropine controlled the colic, although of course the victims still had the lead poisoning.

So, when anxious mothers later brought in screaming, colicky babies, Dr. Haas thought of the unfortunate painters. Much of the colic was due to pylorospasm and pyloric stenosis, or narrowing of the opening of the stomach into the small intestine. The pylorospasm and the pyloric stenosis, he decided, were one entity, not two. The symptoms, in addition to the colic, included visible peristalsis, vomiting, constipation, constant crying. Through the years the condition had gathered a formidable accretion of vague but learned-sounding names: myotonia, myotonia spastica perstans, arthrogryposis, essential contractures, pseudotetanus, tetanoid conditions, infantile tetany, spasmophilia, vagotonia, etc. It was the result, he decided, of an overactive parasympathetic or autonomic nervous system; the pyloric stenosis was due to repeated spasm, the pyloric muscle enlarging from exercise like any other muscle. There was no pathology, no "tumor," except for the enlarged muscle.

The conventional but dangerous treatment was surgery, to cut the muscle fibers. This was in 1916; few surgeons were equipped then to do the operation or had the properly trained team of nurses, nutritionists, etc., to make it safe; death was almost inevitable. Dr. Haas, remembering the colicky painters, used atropine; it relieved the spasm and the colic, bringing about clinically the same results as the few successful operations.

He read his first scientific paper on the atropine treatment in May, 1918; it received, he recalls now, a "very warm reception" from skeptical physicians. Today, he thinks, still too many operations are being performed, even though the technic has improved and the operation is much less dangerous; where one operation is actually needed, in his opinion, twenty are performed. When successful, the operation relieves the condition with dramatic quickness; but there are few cases in which operation is needed. Dr. Haas points approvingly to Scandinavia, where the operation is, as it should be, "a procedure of last resort."

Dr. Haas, who does no surgery himself, was also conservative about myringotomy (puncturing of the ear drum) for acute otitis media. In 1921 he wrote a paper maintaining that early myringotomy was neither desirable nor necessary. At first, he explained, he delayed myringotomy for a few hours, then for longer periods, "until finally after years it was delayed long enough to show that in most cases it was unnecessary." There were, he found, fewer complications with the conservative treatment. He fought the battle against early myringotomy for twenty years; doctors, he explains, are opposed to change, and an operation often seems the easiest way for both patient and physician. Antibiotics finally won the battle for him; not one myringotomy is done nowadays where 1,000 were done twenty years ago.

Now famed as a pediatrician, Dr. Haas almost became a psychiatrist. Several things helped steer him away from that specialty. One was a harrowing experience he had while an intern at Mt. Sinai; he still shudders as he recalls it. He had become interested in hypnotism through the influence of the French neurologist Jean Charcot. Dr. Haas and other physicians on the staff tried to hypnotize a young woman patient who, they thought, was suffering from hysteria. But neither he nor the others could succeed in hypnotizing her, and they left her. About fifteen minutes later a nurse came up to them and announced deferentially: "The patient in Bed 14 is dead." She was suffering, it turned out, not from hysteria but a cerebral disease none of them had suspected.

That was the last straw. Dr. Haas never practiced hypnotism again, gradually turned away from psychiatry. In those days, some fifty years ago, psychiatry concerned itself chiefly with the insane. Its results, Dr. Haas says now, were doubtful or nonexistent. He explains smiling: "Being a neurotic myself, I felt keenly being able to do so little for the psychotics."

Dr. Haas first went into general practice, and began to specialize in pediatrics about thirty-five years ago. He liked general practice and hated to narrow his activities, but found he could not handle both general practice and pediatrics; so he decided to specialize. In both general practice and pediatrics, he felt, he could, unlike psychiatry, do something for his patients.

Dr. Haas, now white-haired and white-moustached, says: "I was a long time finding myself." He did not decide to study medicine until he was 22. Born in Chicago February 14 (St. Valentine's Day), 1870, the year of the Great Fire, he recalls how his mother told him about 100 refugees crowding into their home, which was outside the fire-damaged area. His father died when he was six, and they moved back to New York, where his mother's family lived. He attended New York public schools. For a time he wanted to be an actor (he still has the expressive face and hands of a

good Shakespearean actor), and went to an elocution school. Although he had a fine time declaiming in blank verse, his mother did not approve of the theater; dutifully, he gave up the idea. When he was 16, he "followed Greeley's advice," and went west. An uncle, who lived in St. Joseph, Missouri, got him a job as a clerk in a general store in the tiny village (population: 150) of Home Station, Kansas. It was in the days of Kansas prohibition, and he grins mischievously as he tells of the kegs of beer that used to arrive with yellow signs reading "Nails."

In Home Station, he recalls philosophically, "I vegetated for a year and a half." He played with the idea of studying law and even invested $14—at a time when he was making $30 a month—in a copy of Blackstone. But he found he did not like law. He went back East and spent four years in business, from 1888 to 1892, working with his brother in the textile firm of Haas Brothers, importers and manufacturers of women's clothes.

However, business did not satisfy him, either, and he went to a public night school where some of his fellow students were going to be lawyers—and some doctors. He explains: "I sized them up, and I decided that if they could be doctors I could be, too." Another uncle, a doctor, helped him turn his thoughts toward medicine; the uncle had a laboratory "better than many hospitals do today." He was more scientist than physician, and was interested chiefly in research. He was so much absorbed in his work that, in the absent-minded professor tradition, if his wife asked him to go to the store for a loaf of bread, he was likely to forget all about it and come home with new chemicals.

After finishing night school, young Haas first studied at the College of the City of New York, then at New York University, finally at Columbia University's College of Physicians and Surgeons, from which he graduated in 1895. He interned at Mt. Sinai for two years; the hospital was one of the few in those days that had a two-year internship. For six months he was on the staff of the former Ophthalmic-Aural Institute. His blue eyes twinkle as he recalls that Dr. Herman Knapp, head of the Institute and his professor of ophthalmology at Physicians & Surgeons, decided to accept him on the staff for a perverse reason. Dr. Knapp's half-humorous explanation was "I think I take you on. You did so badly in ophthalmology I think you need it." He found his experience there valuable; ability to examine the eye ground, he thinks, is essential for any neurologic examination and every neurologist and psychiatrist should be able to use the ophthalmoscope, as a means of detecting conditions like arteriosclerosis, syphilis, and renal disease that might cause mental illness.

On January 1, 1898, he started practicing. So the luncheon held in New York last March in honor of his "fifty years of service" was really for fifty-one years. He began his practice within half a mile of his present home and office, an 18-room greystone house near Central Park. It was uptown New York in those days, when horsecars clattered along Broadway. He did not own a carriage at first, but hired a coupe (a two-passenger, four-wheeled horsedrawn vehicle) at $1 an hour to make his rounds. In 1905 he bought his first automobile, an air-cooled two-cylinder Knox, with wooden mudguards and a buggy-like top. It had oil lamps, no windshield; its license plate showed that it was the 16,256th car licensed in the state of New York. Later he owned Franklins, Packards, Buicks; he has never been without a car since that first one, but he has not driven since 1943.

In his fifty-one years of practice Dr. Haas has seen fads come and go. When he started out, the doctor who could reduce a fever the fastest was the best doctor. It was the era of "antipyretics." Only later was it learned that a certain amount of fever is necessary to elaborate antibodies. From about 1900 to 1915 the fad was "percentage feeding"; milk was broken down, and certain percentages of fat, sugar, protein, etc. were added. Elaborate cards were printed showing just how to do it. The process was so complicated that Dr. Haas developed a six-sided measuring glass, each marking a different percentage of fat, etc. It was an invention of desperation; he explains, "It was the only way I could do it." Percentage feeding seemed very scientific in those days, and doctors thought they were really accomplishing something. Today not one medical student in one thousand has ever even heard of percentage feeding. It did no harm, and did no good, Dr. Haas believes.

Brisk and active at 79, Dr. Haas has no plans for retiring. He practices with his son, Dr. Merrill "Pat" Haas; Merrill's twin brother, Gilbert, is an investment counsellor; a third son, Sidney, Jr., is an industrial engineer. Some days Dr. Haas and his son may see as many as 30 "children"; he takes patients up to 16 or 17. He is active at New York Polyclinic Hospital, where, as professor of pediatrics, he teaches several afternoons a week; he is also chairman of its credentials committee. He has office hours every day except Sunday and Thursday. He got the habit of taking Thursdays off when he was chief of the contagious service at New York City's Riverside Hospital, on North Brothers Island, from 1922 to 1933, and has kept it up. He found it a good time for visiting museums and catching up on reading medical literature. Now he spends most of his Thursdays working on his first book—on celiac disease.

He has always taken long vacations, sometimes two or three months in the summer. He likes to travel and for years he was fascinated by the cliff

dwellers and visited many of their settlements in Arizona and New Mexico. Now he spends much of his time off at the farm he has owned for the past thirty-five years in Westchester County, about an hour's drive from his home. He calls it "Florival Farm," a rough translation of his mother's name, Blumenthal (flowering vale). He enjoys landscaping; he is interested in building walls—his gardener says he is "hell on walls"—and in evergreens, but he does not care much about flowers. About thirty years ago he started an evergreen nursery as the result of a sales talk from a traveling tree surgeon. The tree surgeon offered to trim his trees; he turned him down, explaining that he did his own surgery on trees, although not on his patients. But they became partners in the nursery on his farm. Later the tree surgeon pulled out and Dr. Haas was stuck with about 1,000 trees. Most of them are still growing there, too big to move; he does not mind; he likes evergreens.

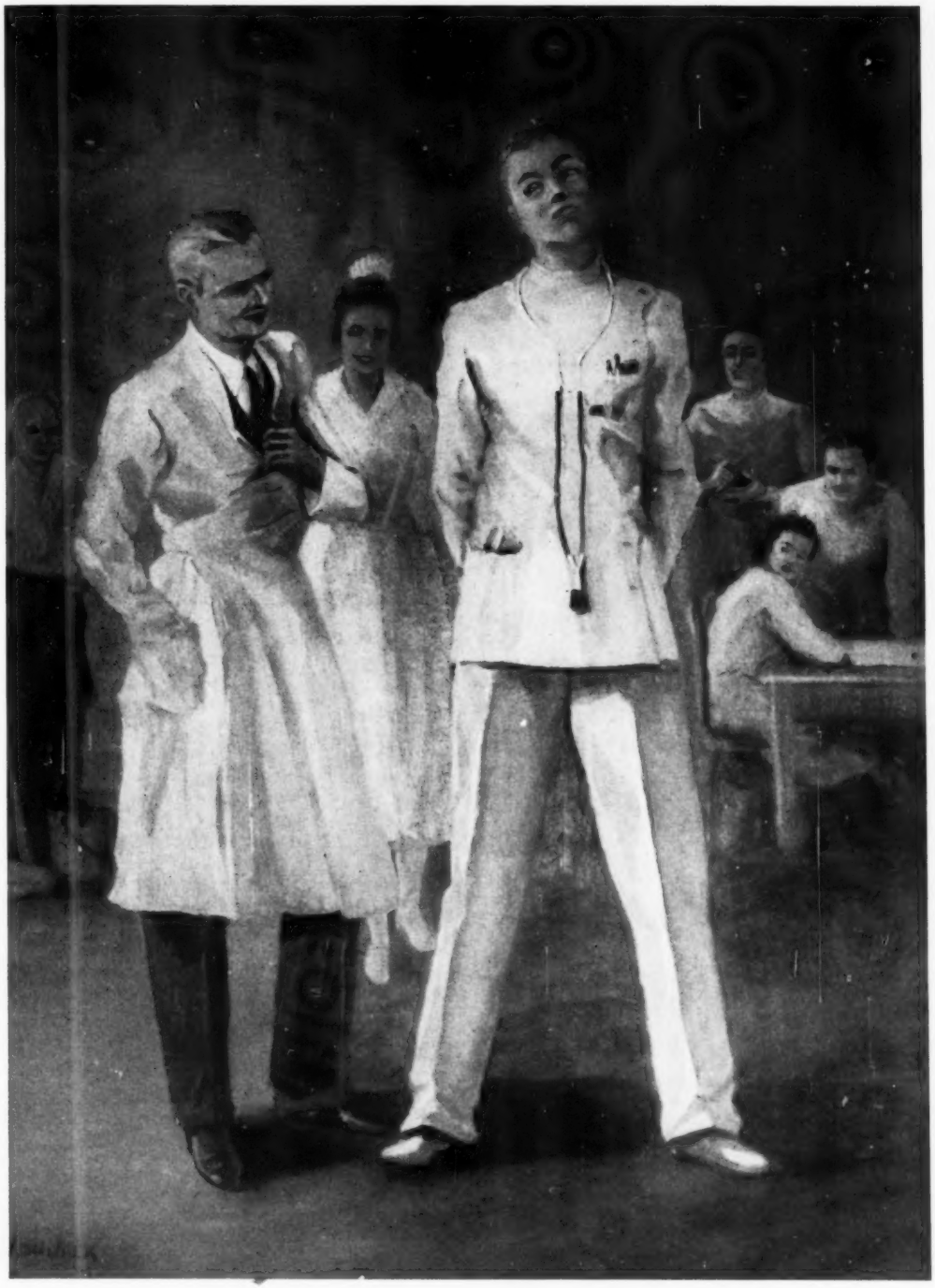
Dr. Haas likes movies and concerts, but not the opera; he goes to the theater only occasionally, with his wife, the former Helen Patterson, since tickets are hard to get for the plays they want to see. He has never been active in medical politics, because he thinks official jobs in medical societies are just "chores" and believes in letting those who enjoy it take care of them. He belongs only to the American Medical Association and the New York Academy of Medicine.

Dr. Haas still combines his early interest in psychiatry with his life-long interest in diet. Wrong diets, he has found, can cause emotional disturbances in children—just as an adult may become grouchy and depressed after having eaten and drunk too much at a banquet. Several years ago a boy of 12 was brought to him because he was emotionally upset and cried too easily. He found that he was given half a dozen lamb chops for lunch, as well as other meat for dinner. Dr. Haas cut down on the meat, and the boy recovered. Another case was that of a 3-year-old boy whom his parents described as a "wildcat." He was also being given too much meat—two or three cups of beef juice a day in addition to other meat—and cutting down the meat calmed down the boy. Too much milk and eggs, too, may cause emotional disturbances in children, he has found. He has no dietary peculiarities of his own; he does like to eat bananas, but just because they taste good. He stopped smoking twenty years ago "on doctor's orders"; at the same time he was told to stop drinking coffee. He has not smoked since, but defied the doctor by going back to coffee after five years' abstinence.

In his half century of medical experience Dr. Haas has developed common-sense ideas about children. Babies' feedings, he thinks, should be on a schedule, but one that is not too strict. The first feeding of the day, and the last one, may be variable, depending on when the baby gets hungry. If it wakes at 5 A.M., for instance, and is hungry, it is a good idea to feed it even though the schedule calls for 7 A.M. By seven months, he thinks, a baby should have settled down to getting three meals a day. He has done little in obstetrics, and admits he is no expert; but he is inclined to think that modern women are neurotic about the whole thing. Childbirth should be a natural function, he believes, and often too much fuss is made about it.

Dr. Haas never tires of children. He often stops to play with them on the street. Any conversation with him in or out of office hours is likely to be interrupted by telephone calls from worried mothers. His end of the conversation may run like this: "How's the boy getting on? That's fine. That's splendid." He has never lost his enthusiasm, and explains with a smile: "You either like children or you don't. I like them." The child specialist feels that he and his wife have done well with their own sons. They would rather come home than go anywhere else.

GEORGE R. BURNS



WISDOM AND KNOWLEDGE

(J. Louis Jack, M.D., North Haven, Connecticut)

Reproduced from a painting shown at the 1949 exhibition of the American Physicians Art Association, this was one of more than 1,200 works of art displayed by physician-artists. Sponsored annually for the last twelve years by Mead Johnson & Company, the exhibition was held in conjunction with the Atlantic City meeting of the American Medical Association.

Association Notes

IPMA HONORS CHEVALIER JACKSON

In a special ceremony at the 1949 Assembly, the Interstate Postgraduate Medical Association of North America awarded its Medallion of Honor to Dr. Chevalier Jackson, fourth recipient of the honor in the Association's history. Previous winners of the Medallion were Mr. Thomas A. Edison in 1929; Drs. Charles and William J. Mayo in 1936, and Dr. George W. Crile, Sr. in 1937.

Dr. Jackson, honorary professor of bronchoesophagology at the Temple University Medical School in Philadelphia, was cited for his pioneering developments in bronchoscopy, his contributions in this field, and his accomplishments in instructing other physicians all over the world in the technic of bronchoscopy.

Presenting Dr. Jackson with the Medallion, Dr. Waltman Walters, I.P.M.A. president, said:

"Thrice Chevalier—once by baptism, again as a Chevalier of the Legion of Honor of France, and again as a Chevalier of the Order of Leopold of Italy; scientist, investigator, one of the original pioneers in the development of bronchoscopy, who in the early days made his own instruments and used them to diagnose and treat intrabronchial lesions.

"You have, sir, exemplified the highest thing in American science; you have by your conscientious work, investigation, teaching, trained men who have gone to all corners of this country and other countries to carry on the work which you pioneered. It is in their behalf as well as in behalf of the members of the Interstate Postgraduate Medical Association and the Board of Trustees, that I am very happy indeed and honored, as we all are, to present to you this Medallion of Honor.

"I should like to read, before I give it to you, what appears on the face of it: 'Presented to Chevalier Jackson, Philadelphia Assembly, November 3, 1949, by the Interstate Postgraduate Medical Association of North America, to commemorate his contribution to the progress of scientific medicine and his benefactions to humanity.'

"On the other side of the Medallion is the Seal of the Interstate Postgraduate Medical Association.

"It is a pleasure and honor for me, therefore, Dr. Jackson, to present this to you in behalf of this Association."

Also taking part in the ceremony were Dr. Robert L. Johnson, president of Temple University representing the citizens of Philadelphia, and Dr. William N. Parkinson, dean, Temple University School of Medicine, speaking for the University.

In his acceptance remarks, Dr. Jackson said:

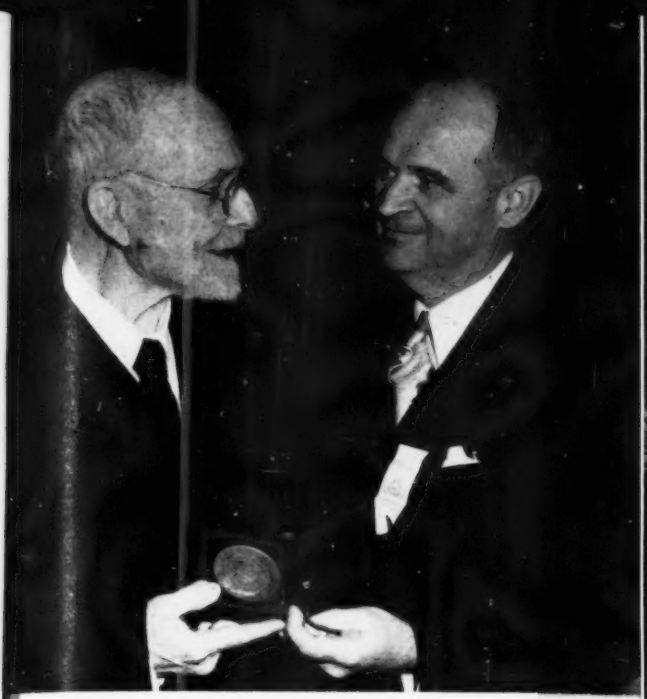
"When I think of the fact that I have been selected for this great honor, this great distinction . . . to me it is just appalling, it is bewildering, it is overwhelming. And when I think of my four distinguished predecessors who were recipients of this honor, illustrious men, among the greatest men of their time—there are only four of them and they have all passed away—I develop an inferiority complex.

"A wee small voice keeps whispering to me, 'Now, Dr. Jackson, you know perfectly well you don't deserve this honor, you don't merit it.' And the worst of it is that at my time of life no man can conscientiously and sincerely promise to try to merit it in the future; he hasn't any future worth mentioning.

"I thank the Board of Trustees and all of the officers of this organization, and I thank President Walters for his kind remarks. I appreciate what Dr. Parkinson and Dr. Johnson enumerated in the way of incidents. But it seems to me that all I ever did could be summed up in this brief epitaph: Like a hickory cog in the old mill wheel, he did his part as his turn came 'round. To me that is all I can see in it.

"My mother told me that on the fourth of November, 1865, the year that ended the Civil War, I was born at three o'clock in the morning. That being the case, within ten or eleven hours Father Time will start on my eighty-fifth year.

"It seems to me that all that I have been able to accomplish is due to a happy home life, and all the credit should go to those who maintained that happy home life. My grandmother, my mother, my wife's mother, who was always like a mother to me, and my wife all had the happy faculty of maintaining a quiet, happy, restful home. . . . This brings to me a very sad note. It lessens very much the pleasure that I have on this occasion this afternoon, not, of course, anything to do with appreciation, but my personal joy in this event would be very much greater if I could take this Medallion home and show it to those who saved my life, who nursed me through three attacks of tuberculosis, and who always maintained that happy home, that restful place. I should like to show this to my grandmother, to my mother, to my wife's mother. . . . They would be proud of it. But they have all passed away. There is one little lady still living, my wife. I will take this home to her. She will appreciate it; she will be proud. I thank you."



AT THE PHILADELPHIA ASSEMBLY

Some highlights of the 1949 Assembly of the Interstate Postgraduate Medical Association, held in Philadelphia October 31 to November 3, are pictured here. *Above, left:* Dr. Waltman Walters presents the Medallion of Honor of the Association to Dr. Chevalier Jackson *(story on facing page)*; *above, right:* Dr. Frank H. Lahey is presented with a bouquet at the conclusion of his twenty-fourth annual address before the Assembly—a token of appreciation by the Board of Trustees of the Interstate Postgraduate Medical Association, for his outstanding contributions to a record number of I.P.M.A. meetings; *center, right:* patients being presented during diagnostic clinic; *below, left:* a view of the technical exhibits hall during an intermission; *below, right:* the *Postgraduate Medicine* booth.

Changing Concepts in Surgery

EVARTS A. GRAHAM*

WASHINGTON UNIVERSITY SCHOOL OF MEDICINE AND BARNES HOSPITAL, ST. LOUIS

Excision of a goiter is seldom to be thought of; . . . instances are not often met with in which a surgeon would think it proper to undertake so serious a procedure for an affection that is not necessarily mortal."

"Resection for primary cancer (of the lung) is condemned past appeal."

"The utmost that the surgeon can do is . . . to follow even into the lung a sarcoma growing from the chest wall: but this will never be more than one of the brilliant exceptions of surgery."

The first statement is a quotation from Erichsen's *Science and Art of Surgery,* published in Philadelphia in 1878. The other remarks are from the address of Réclus at the French Surgical Congress in 1895, the full text of which was quoted by Stephen Paget in 1896 in his book, *The Surgery of the Chest.* Paget incorporated Réclus' address in his book because of his thorough approval of it.

The quotations which I have made here undoubtedly represent the prevailing surgical opinion of the time. Erichsen's text book which went through many editions in both England and the United States was probably the one most used and studied in the English-speaking world for a period of ten or fifteen years. Paget's book was the first extensive treatise on chest surgery.

The remarks are interesting to us now not only because they give us an idea of surgical opinion and practice three-quarters, and a half a century ago, respectively, but also because the distinguished authors of those remarks indulged in prophecy which has turned out to be ridiculous. Many other similar statements could be collected from the surgical literature of not so long ago. It would be interesting if Erichsen and Réclus could visit a modern, large surgical clinic where thyroidectomy and pulmonary resection for cancer or other diseases are of almost daily occurrence.

Yet we should not be too uncharitable to those surgeons who proved to be poor prophets. There had not been sufficient time since Lister's monumental work to have any idea of the future accomplishments of surgery. It might have been better, however, if they had had the wisdom expressed in Lowell's Biglow Papers,

My gran'ther's rule was safer 'n 'tis to crow;
Don't never prophesy—onless ye know.

At the time Erichsen and Réclus were writing, surgery was just emerging from that phase when it was known as "external medicine." Although Lister's work was to extend greatly the possibility of operative attack on many diseases of the viscera or internal organs, other advances had to be made before visceral, and indeed all, surgical operations could be performed with the astounding degree of safety and success to which we are accustomed today. It was necessary particularly to have greatly improved anesthesia and a means of preventing that mysterious cause of death which baffled the surgeons, known as shock. Today we are reasonably well satisfied with our knowledge of how to conduct a safe anesthesia and of how to prevent fatal shock. Indeed we may compare with comfortable satisfaction the surgery of today with that of only fifty years ago. On the basis of that comparison we might have the temerity to indulge ourselves in authoritarian prophecy that there can be no further important advances in surgery.

Might we not ask, "What important unknown

*Presidential address before the Interstate Postgraduate Medical Association, Wednesday, November 2, 1949, at Philadelphia Assembly.

fields are there for the surgeon to conquer? Every organ and tissue of the body has been successfully operated on for a variety of conditions. Our operative mortalities are thoroughly respectable. For the most part our patients leave the hospital in less than two weeks after the operation, and they are reasonably comfortable during most of the time they are in the hospital. How could any further improvement be made?"

It is true that practically all of what may be called the anatomical frontier of surgery has been conquered and opened up to the surgeon. Perhaps the only exception is the inside of the heart. Even in that region such progress is being rapidly made that it seems not only possible but probable that very soon, perhaps within a year or two, many patients will be operated on for the correction of valvular defects and abnormal openings in the interauricular and interventricular septa.

I have used the term "anatomical frontier." There are other frontiers. One might speak of a "physiological frontier." By this I mean, for example, the many problems involved in the study of the disturbances of the patient's metabolism produced by his disease and by the trauma of the surgical operation. Many important contributions to our knowledge of these subjects have already been made. But too little is known today about the processes of repair which enable a patient to recover from an operation. For example, almost nothing is known about the mechanisms of wound healing. Lister showed us the desirability of keeping bacteria out of the wound, and more recently we have learned the importance of vitamin C. But we know practically nothing of the enzymes which must be at work to form adult scar tissue from the fibroblasts, to stimulate the epithelial cells of the skin and mucous membranes to grow and cover the scar tissue, or the fundamental processes which result in the development of new bone, etc. These are essentially chemical phenomena which should be of the greatest interest to the surgeon.

Today we are probably too willing to accept the idea that from eight to ten days are required for the healing of an uninfected wound as if this time were unchangeable. On the other hand, if we could understand better the fundamental chemical processes, might we not look forward to the time when the healing of an ordinary wound would require perhaps only two or three days and the healing of a fractured bone only two or three weeks?

EVARTS A. GRAHAM

THE physiological frontier is capable of indefinite expansion if we think of a surgeon as one who is interested in something more than cutting and sewing. If he has scientific curiosity, why should he not be interested in the causes and detailed pathogenesis of the diseases themselves? We can go further and ask, why should he not be interested in developing methods of treatment other than by operation? Would it not be an exciting adventure for a surgeon to discover a method of dissolving gallstones and urinary calculi *in situ* so that operations for these conditions would become at least infrequent or even obsolete? The surgical literature, as a matter of fact does record numerous instances of experimental attempts by surgeons to find such methods. Would not any surgeon be happy to discover a method which would eradicate cancer by the simple use of the hypodermic syringe?

I mention these few examples merely to emphasize the fact that although the anatomical frontiers of surgery are being rapidly closed, the physiological frontiers are wide open and extend quite indefinitely.

It is not a new concept that the surgeon is able to make important discoveries in physiology. Indeed a large number of such discoveries have been made by surgeons. As examples there can be offered much of our knowledge of the functions of the thyroid, of various parts of the brain, certain aspects of the physiology of respiration and of digestion, important features of metabolism, most of what is known about surgical shock, etc.

Only recently, however, have any considerable number of young surgeons undertaken a serious

study of chemistry in order to equip themselves for an attack on those problems which come particularly within the surgeon's field. It seems to be a relatively new concept for surgeons to become equipped in a field apparently as remote from the operating room, as is chemistry, to help close some of the physiological frontiers of surgery. Yet the young Lister was able to see the applicability of the work of the young chemist, Pasteur, to the problem of wound healing. It is to be hoped that in the near future these chemically and physiologically trained young surgeons will accomplish much in the conquest of disease which, I take it, is the goal of surgeons as well as of all others interested in medicine.

In spite of the danger of exposing oneself to ridicule by indulging in some prophecy and of ignoring the warning expressed earlier, let us speculate a moment on what the results on surgery will be when these young surgeons who are being equipped and trained for fundamental research get into full swing. At the present time the conditions which are generally considered to constitute the surgeon's field are chiefly the results of (1) infections, (2) trauma, (3) fetal maldevelopment, (4) disturbances of metabolism as seen in gallstones and kidney stones, and (5) abnormal growth as shown in neoplasms. Perhaps we might add as (6) those conditions which more and more seem to be psychosomatic disturbances, such as peptic ulcer, hyperthyroidism, hypertension, ulcerative colitis, regional ileitis, etc.

We have already seen within less than a decade practically the disappearance of many of the infections, formerly common, which were considered to be surgical diseases. I might mention as examples, postpneumonic empyema, the surgical complications of gonorrhea, mastoiditis, acute osteomyelitis. Others could be named. Such has been the startling result of the antibiotics. If newer, more potent ones with a wider range of application are discovered, the surgeon will be called upon less and less to perform operations for infections, even including tuberculosis.

The conditions due to metabolic and psychosomatic disturbances are very likely to become less frequent as their fundamental processes become better understood and their prevention consequently more easily accomplished. It would seem therefore that a considerable reduction in the amount of surgery in this category is to be expected. Perhaps therefore operations, for example, for gallstones, kidney stones, peptic ulcer, hyperthyroidism, hypertension, etc., will become as rare as they are now for empyema, osteomyelitis, salpingitis, etc.

The problem of neoplasm seems at present to be a harder nut to crack than the others just mentioned. Yet the time must come when many kinds of neoplasm, perhaps even cancer itself, will be treated effectively by other means than present-day surgery. Don't ask me how. It is for the young men to find out.

When the time comes for this prophecy to be fulfilled the surgeon's practice will be limited to the results of trauma and to the correction of congenital deformities and maldevelopment. Until homo sapiens becomes more sapient I can see no prospect of his ever avoiding the foolishness of war or of his learning that two automobiles cannot occupy the same spot at the same time, especially when they come from opposite directions. Broken bones and lacerated wounds are therefore likely to require surgical attention for as long as this would-be clairvoyant can see into the future. Likewise it is difficult now to foresee how congenital deformities can be corrected except by surgery. However, perhaps methods will be found to diminish even their frequency if not to prevent them.

If the time ever comes when these predictions come true, then surgery will be chiefly applied anatomy. Diagnosis will be self-evident and but little physiology will be needed. That was the state of surgery as recently as a century ago. We have gone an incredible distance at an incredible speed since then. Perhaps our great grandchildren will be interested in the fact that surgery will have completed a cycle by their time and returned to the early condition of being little more than applied anatomy.

The splendid scientifically trained young surgeons now about to take their place in the world will be no little responsible for this completion of the cycle. They will have helped to destroy their own profession. But that has ever been the ideal of the true physician, to prevent disease rather than to cure it. I say God speed to them in their exciting adventures in the great conquest of disease. I wish I could march along with them.

New Drugs *and* Instruments

Information published in this department has been supplied by the manufacturers of the products described.

INFO-DEX RECORD CONTROL SYSTEM

PURPOSE: Compact method for keeping complete case histories.

DESCRIPTION: The card on which a patient's medical record is begun folds across the middle, becoming a file to hold subsequent cards. These subsequent cards are attached in correct sequence to the folder by means of a cotter pin inserted through holes in the cards. As many as 15 cards can be held. The cotter pin holds the cards in place, permits them to be fanned out, and makes it possible to read or write entries on any card without detaching it. The system provides additional cards of various colors on which to record special data, such as laboratory reports, obstetrical records, etc. Filing is alphabetical.

Included is an automatic diagnostic cross-indexing system. Financial record cards may be included with the case history folder or kept separately.

Sample cards can be obtained from:

PRODUCER: Medical Case History Bureau, 11 West 42nd St., New York 18, N.Y.

POLY-VI-SOL

PURPOSE: Water-soluble vitamin preparation.

COMPOSITION: Each 0.6 cc. supplies:

Vitamin A	5,000 units
Vitamin D	1,000 units
Ascorbic acid	50 mg.
Thiamine	1 mg.
Riboflavin	0.8 mg.
Niacinamide	5 mg.

DOSAGE AND ADMINISTRATION: Usual daily dose for full term infants is 0.6 cc. May be stirred into feeding formula, fruit juice or other food, or dropped directly into infant's mouth.

HOW SUPPLIED: In 15 cc. and 50 cc. bottles with dropper marked in 0.3 and 0.6 cc. calibrations.

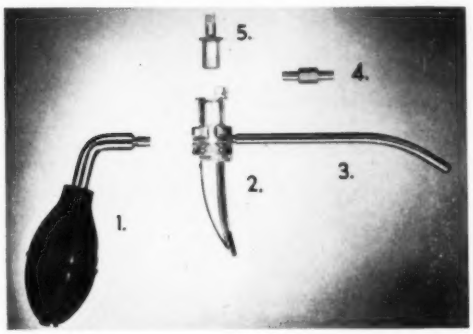
PRODUCER: Mead Johnson & Co., Evansville, Ind.

SCHERING TAX GUIDE

The "Schering Physicians' Income Tax Guide for 1950" is a new and revised edition of the compilation of information on preparing the doctor's income tax declaration and return. It provides authoritative answers for questions ranging from general tax return procedure to such problems as bad debts or the deductibility of reading matter for the physician's waiting room.

Distributed free on request to:

Medical Service Department of Schering Corporation, Bloomfield, N. J.



MANOLATOR

DESCRIPTION: A device to permit the physician to apply penicillin powder topically, using either his office air pressure line or a hand bulb. It includes (1) hand bulb; (2) finger grip; (3) applicator tube; (4) adapter tube tip; (5) Aerohalor cartridge, which contains 100,000 units of crystalline penicillin G potassium.

CAUTION: The powder in Aerohalor cartridges is not necessarily sterile. It is not intended that the topical application of the powder be made through a surgical incision, and the use of powder in that manner cannot be recommended.

PRODUCER: Abbott Laboratories, North Chicago, Ill.

DRAM-CILLIN

PURPOSE: Oral penicillin for "teaspoon" dosage to older children and adults.

DESCRIPTION: A stable dry powder which retains potency for eighteen months without refrigeration. In solution, Dram-cillin provides 100,000 units of penicillin G potassium in a teaspoonful.

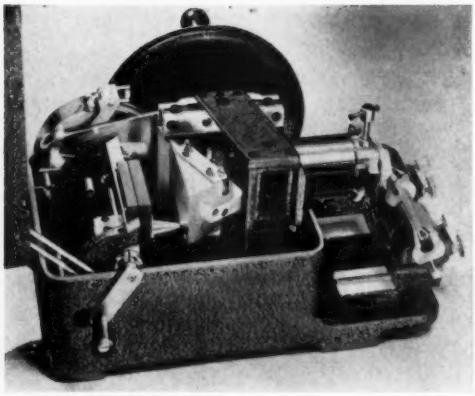
HOW SUPPLIED: In a 60 cc. "pour lip" bottle containing 1,200,000 units of penicillin.

PRODUCER: White Laboratories, Inc., Newark, N. J.

FLUORESCENT SUN LAMP

DESCRIPTION: Available in either 20- or 40-watt sizes. this lamp is identical in dimensions and electrical operating characteristics with standard fluorescent lamps. Produces a soft blue light, remains cool and has a life of more than 4,000 hours. This lamp emits a concentrated band of mid-ultraviolet radiations. With the use of high intensities, a sun tan can be acquired; with lower intensities it can be used for space irradiation.

PRODUCER: Westinghouse Electric Corporation, Pittsburgh 30, Pa.



NEW SPENCER MICROTOME

DESCRIPTION: Specially adapted microtome cuts specimens thin enough for the electron microscope to penetrate (2/254,000 of an inch or less). About 4,000 of them equal the thickness of a fine blond human hair. Turned on edge, they cannot be seen by the naked eye.

The method of sectioning (by the Pease-Baker technic) consists of doubly embedding the tissue in celloidin and paraffin. After cutting, the minute sections are picked up and placed on a microscope slide using needles or a fine brush under a low power binocular microscope. The paraffin, and when desirable the celloidin, is then removed and the specimen made ready for the microscope.

HOW SUPPLIED: May be obtained as a complete rotary microtome or as an adapter for converting the Spencer No. 820 Microtome for thin sectioning.

PRODUCER: American Optical Company Instrument Division, Southbridge, Mass.

RONIACOL TARTRATE

PURPOSE: Peripheral vasodilator.

DESCRIPTION: Chemically, Roniacol is the alcohol corresponding to nicotinic acid; its action is, however, more prolonged and patients do not develop tolerance to it.

INDICATIONS FOR USE: Vascular spasm, Raynaud's syndrome, endarteritis, Buerger's disease, intermittent claudication, varicose ulcers and other conditions associated with deficient blood supply.

DOSAGE AND ADMINISTRATION: From 1 to 4 tablets are given one to three times daily.

HOW SUPPLIED: In scored tablets containing 50 mg. of nicotinic acid alcohol, bottles of 100 and 500.

PRODUCER: Hoffmann-La Roche, Inc., Nutley, N.J.

OLOTHORB CAPSULES

PURPOSE: Acceleration of fat absorption in the small intestine.

COMPOSITION: Each capsule contains 0.5 gm. of the active medicament, polyoxyethylene sorbitan monooleate.

INDICATIONS FOR USE: In patients with chronic diseases of the gastrointestinal tract and in those who have been subjected to certain operations on the intestinal tract.

DOSAGE AND ADMINISTRATION: Administered with meals in a minimal daily dosage of 6 gm. (2 gm. or four capsules three times a day). In addition, an adequate diet should be provided, including a minimum of from 125 to 150 gm. of fat.

HOW SUPPLIED: Bottles of 100 and 1,000 capsules.

PRODUCER: Sharp & Dohme, Inc., Philadelphia, Pa.

DASIKON

PURPOSE: Treatment of the common cold.

COMPOSITION: Each capsule contains:

Semikon hydrochloride (methapyriline hydrochloride)	25 mg. (⅜ gr.)
Caffeine	30 mg. (½ gr.)
Aspirin	0.2 gm. (3 gr.)
Acetophenetidin	0.12 gm. (2 gr.)
Atropine sulfate	.06 mg. (1/1000 gr.)

DOSAGE AND ADMINISTRATION: Two capsules at the first sign of a cold, followed by 2 capsules every three hours for 2 doses, then 1 capsule every four hours. A maximum of 8 capsules in twenty-four hours.

HOW SUPPLIED: In bottles of 100, 500, and 1,000 blue-top capsules.

PRODUCER: The S. E. Massengill Company, Bristol, Tenn.

ROBITUSSIN

PURPOSE: Antitussive-expectorant.

COMPOSITION: Each 5 cc. (1 teaspoonful) contains:

Glyceryl guaiacolate	100 mg.
Desoxyephedrine hydrochloride	1 mg.

In an aromatic syrup.

DOSAGE AND ADMINISTRATION: Children—one-half to one teaspoonful, according to age, three or more times daily. Adults—one or two teaspoonfuls, as necessary every two to three hours.

HOW SUPPLIED: Pint and gallon bottles.

PRODUCER: A. H. Robins Company, Inc., Richmond, Va.

PABASYL TABLETS

PURPOSE: Treatment of rheumatoid arthritis, acute rheumatic fever; prophylaxis of recurrent rheumatic fever, fibrositis, and gout.

COMPOSITION: Each tablet contains:

Sodium salicylates	0.3 gm. (5 gr.)
Para-aminobenzoic acid (as the sodium salt)	0.3 gm. (5 gr.)
Ascorbic acid	0.010 gm. (10 mg.)

DOSAGE AND ADMINISTRATION: Two tablets three times daily or as directed by the physician.

HOW SUPPLIED: Bottles of 100 enteric-coated tablets.

PRODUCER: Ives-Cameron Company, Inc., New York, N.Y.

X-ray of obese subject: (220 lbs.—5 ft. 9″ high); thickness of part x-rayed was 29 cm.: portable machine, 15 milliamperes, 80 kilo-volts, distance 30 cm., time 3½ sec.

X-ray of medium subject: (185 lbs.—6 ft. 1″ high); thickness of the part x-rayed was 23 cm.: portable machine, 15 milliamperes, 70 kilo-volts, distance 30 cm., time 4 sec.

RAY-TEC*
X-RAY DETECTABLE SPONGES

DESCRIPTION: The long x-ray detectable monofilament, treated with barium sulfate U.S.P., covers a wide area on the x-ray plate and is identified by its unique radiographic configurations—different in shape and pattern from body structures. It is firmly anchored to the innerfolds of the gauze, does not deteriorate in the body, and is unaffected by sterilization.

Ray-Tec sponges are folded uniformly with all cut edges folded to the inside. They are available in a variety of standard sponge sizes and in Laparotomy Packs with loop tapes.

PRODUCER: Johnson & Johnson, Hospital Division, New Brunswick, N. J.

*Trade Mark.

QUADRONAL TABLETS

PURPOSE: Antiasthmatic.

COMPOSITION: Each tablet contains:

Ephedrine hydrochloride	25 mg. (⅜ gr.)
Phenobarbital	25 mg. (⅜ gr.)
Phyllicin	0.12 gm. (2 gr.)
Potassium iodide	0.3 gm. (5 gr.)

INDICATIONS FOR USE: In forestalling the onset of asthma and relief of moderately severe attacks.

CAUTIONS: Contraindicated in vascular or cardiac disease, thyroid conditions, and tuberculosis.

DOSAGE AND ADMINISTRATION: One-half or 1 tablet every three or four hours—not more than 3 tablets per day. For children, the usual dose is ½ tablet three times a day.

HOW SUPPLIED: Bottles of 100, 500, and 1,000 tablets.

PRODUCER: Bilhuber-Knoll Corp., Orange, N. J.

BI-SULFAZINE

PURPOSE: Oral sulfonamide therapy.

COMPOSITION: Each 30 cc. contains:

Sulfadiazine, microcrystalline	1.5 gm. (22 gr.)
Sulfamerazine, microcrystalline	1.5 gm. (22 gr.)

Each teaspoonful supplies 0.5 gm. (7½ gr.) of total sulfonamides.

DOSAGE AND ADMINISTRATION: Adults—initial dose of 2 to 3 tablespoonfuls (3 to 4.5 gm.) followed by maintenance dose of 2 teaspoonfuls (1 gm.) every six hours. Children 3 to 10 years of age—1 tablespoonful, followed by maintenance dose of 2 teaspoonfuls every six hours. In very severe infections, dosage may be increased by 50 per cent.

HOW SUPPLIED: In pint and gallon bottles.

PRODUCER: Warren-Teed Products Co., Columbus, O.

SOLUBLE CRYSTALLINE PENICILLIN TABLETS

PURPOSE: Pediatric use; general oral penicillin therapy; penicillin aerosol inhalation, and for sublingual administration.

COMPOSITION: Each tablet contains 100,000 units of crystalline penicillin G potassium. Foreign substances expressly avoided to promote rapid solubility.

DOSAGE AND ADMINISTRATION: Orally, for children or general use—as indicated for oral penicillin. Aerosol—inhalation of about 250,000 units daily in 5 divided doses is usually sufficient. Sublingually—initial dose, 500,000 units; subsequent doses, 100,000 units every three hours.

HOW SUPPLIED: Packages of 24 and 100 tablets.

PRODUCER: Schenley Laboratories, Inc., New York, N. Y.

Consultation Service

This special consultation information service is offered as a regular monthly feature of *Postgraduate Medicine*. Subscribers are invited to call on this Service for answers to difficult medical problems from members of our Editorial Board and our Editorial Consultants best qualified to help. Each question will be answered by mail and those of general interest will be published each month. Address all communications to Consultation Service, *Postgraduate Medicine*, 516 Essex Building, Minneapolis 3, Minnesota.

TERMINATION OF PREGNANCY IN CASE OF MULTIPLE SCLEROSIS

QUESTION: A patient of mine who has had multiple sclerosis for several years has become pregnant. The disease was first diagnosed when she was 23; she is now 28, and in the fourth month of her pregnancy. She has poor motor function, as well as uncoordinated function of the hands and arms. She speaks with difficulty. Bladder control was gone for a period but has now returned. Would you advise terminating the pregnancy? If not, what procedure should be followed in the further management of the case?

M.D.—Wyoming

ANSWER: Opinion as to termination of pregnancy in multiple sclerosis is greatly divided. The duration of five years of clinically, definitely established multiple sclerosis with the reported findings of severe impaired motor function and loss of bladder control are sufficient for a termination of the pregnancy. In a number of instances we have interrupted the pregnancy in long-standing cases without any detriment to the patient.

In 5 well-supervised and treated cases who thereafter remained in a remission without subjective disturbances but still with some pertinent findings pointing to the diagnosis of multiple sclerosis, pregnancies have resulted in a severe chronic progression without any remissions under therapy.

There have been cases under observation where for religious reasons an interruption of the pregnancy was rejected. These patients terminated their pregnancies uneventfully and were kept in bed for two weeks postpartum with daily liver injections; however, in 2 cases some two to three months postpartum severe exacerbations have occurred with complete disability in the motor functions and only with intensive B_{12} and re-education efforts have they been changed from bedridden to markedly disabled out-patients.

There is no statistical evidence available on a large scale to answer the question whether pregnancy should be interrupted in clinically, well established cases. From clinical experience I can only recommend a termination of the pregnancy.

HANS H. REESE

COLD SENSITIVITY IN CHRONIC POLYNEURITIS

QUESTION: I have a patient who is suffering from chronic polyneuritis with some spinal cord involvement. This condition has existed for approximately two and one-half years.

One of my patient's most bitter complaints is of cold sensitivity. This is so extreme that in a room maintained at an 80° temperature, he is sufficiently uncomfortable that he must wear sweaters and use blankets to keep warm.

Is there anything new which might help this sensitivity? Practically everything he has ever heard of has been tried, but nothing has been successful.

Any suggestions you might make will be greatly appreciated.

M.D.—Illinois

ANSWER: Localized sensitiveness to cold is a common phenomenon following injuries to nerves, but generalized sensitiveness is indicative of some other condition, and if the basal metabolism is normal, it seems likely that it can be attributed to a neurotic response. Some of these patients are more comfortable under tolserol medication, while others have to carry out their full convalescence in a subtropic region, preferably humid. If the patient is already disabled and if the suffering is unendurable, frontal lobotomy might be indicated.

WALTER FREEMAN

DIFFERENTIAL DIAGNOSIS OF RHEUMATIC FEVER

QUESTION: I have recently had referred to me a patient with acute rheumatic fever treated for fourteen months by conventional methods and yet whose sedimentation rate, heart rate, temperature, etc. still indicate moderate to severe rheumatic activity. She has been treated at home during this fourteen-month period and although strict bed rest was ordered it is not certain how closely this order was followed.

Would hospitalization with more strict supervision be indicated in this case? Any suggestions will be greatly appreciated.

M.D.—South Dakota

ANSWER: In rheumatic fever it is unusual for evidences of rheumatic activity to persist for fourteen months. The situation at hand raises some question as to the accuracy of the diagnosis. In such instances one has to consider the possibility of such conditions as lupus erythematosus, rheumatoid arthritis, and so forth. Hospitalization with strict supervision of activity and a period of vigorous therapy with salicylates should be tried.

Thoroughgoing examinations to rule out the possibility of lupus erythematosus and rheumatoid arthritis should be an essential part of the hospital study and observation. If cortisone or ACTH were available, it would be interesting to see what effect the drug would have in such a case.

(Continued on page A-50)

You would have modified her measles

You would have reduced the dangers of measles-resultant complications, probably with Immune Serum Globulin—Cutter

Why would you have chosen Immune Serum Globulin — Cutter? Because it is fractionated with human *venous* blood. Because its known constant gamma globulin content—160 mgm. per cc.—permits low volume adjustable dosage, a most important consideration in modification technique. Too, with Immune Serum Globulin — Cutter — measles may be *prevented* as well as *modified*.

Measles season is now — keep your pharmacist advised of your needs for gamma globulin—and specify Cutter.

It's the gamma *globulin that counts in Cutter Immune Serum Globulin.*

Cutter Immune Serum Globulin-Human*	Blood Source	Solution Appearance	Gamma Globulin Content	Modification Dosage
	Fresh Normal VENOUS Blood	Water-Clear Hemolysis-Free	160 mgm. Per cc.	.025 cc. per lb. body weight

Human* means venous blood, freshly pooled from normal healthy donors.

Water Clear Solution, hemolysis-free and non-pyrogenic.

Gamma Globulin concentration—160 mgm. per cc.—reduces dosage volume with constant globulin potency—adjustable for modification or prevention of measles.

CUTTER LABORATORIES • BERKELEY, CALIFORNIA

Immune Serum Globulin-CUTTER

INJECTION OF PENICILLIN FOR LOCAL INFECTIONS

QUESTION: The literature recently has carried several accounts of the technic of treating local infections by injection of penicillin dissolved in 1 per cent procaine solution. I have attempted this on several occasions, but I invariably get gel formation in the syringe upon mixing the crystalline penicillin G and the procaine solution.

Can you tell me what is wrong with my method? Also, please comment upon the advisability of using crystalline procaine penicillin suspended in Metycaine for prolonged effect in such cases.

M.D.—Florida

ANSWER: If one wishes to add procaine to aqueous solutions of crystalline penicillin to be used for injection in the treatment of local infections, the following is the procedure to employ. Add 6 cc. of a 2 per cent solution of procaine to 100 cc. of the stock solution of penicillin which contains 20,000 units of penicillin per cubic centimeter.

The most satisfactory vehicle to date in which to suspend procaine penicillin is sesame oil.

TREATMENT OF PAGET'S DISEASE (OSTEITIS DEFORMANS)

QUESTION: Kindly outline for me the treatment of Paget's disease (osteitis deformans). Has magnesium carbonate or phosphorus any effect on the condition—that is, arrest the progress of the disease?

M.D.—Pennsylvania

ANSWER: There is no definite treatment for Paget's disease, in the light of present knowledge. It is found that in many cases Paget's disease is improved, so far as pain is concerned, by doses of roentgen-ray treatment over the affected bones, and in a number of cases aluminum acetate mixture has been used effectively, with at least subjective improvement. See the *British Journal of Surgery* 27:651-677 (April) 1940.

To our knowledge magnesium carbonate or phosphorus has no definite effect on the condition, but we have had no experience with it.

PREMENSTRUAL TENSION

QUESTION: Recently a patient with the following history presented herself to me: Mrs. M., age 37 years, multipara 2. Until one year ago she felt perfectly well. Then she noted that her menstrual periods occurred every twenty-one days instead of every twenty-eight days. Bleeding was slow, very dark and slight for the first two days and profuse the next two. Very little associated pain. During her last menstrual period, however, the pain was severe.

One year ago the patient first noted swelling of joints during period; no swelling after. Six months ago she first noted swelling of breasts at menses; after the period, it clears up. Six months ago she also noted for the first time swelling of the hands at period time; after period is over the swelling clears up.

All the symptoms are associated with the menstrual period. In the intervals the patient feels very well and has no complaints.

General physical examination is negative. Red blood cells 4,800,000, hemoglobin 14.5. Urine negative.

I feel this is an endocrine disturbance and would welcome any suggestions as to treatment.

M.D.—Nova Scotia

ANSWER: The multiplicity of symptoms outlined above occurring seven to ten days before each menstrual period is typical of the variegated syndrome associated with premenstrual tension. The breast turgidity, swelling of joints, edema, are not uncommon occurrences.

Most of these patients will respond to such simple therapy as the administration of ammonium chloride, 7½ gr. three times a day for ten days before the onset of the menstrual period. Others respond to chronic doses of thyroid, ½ gr. per day, along with vitamin B complex therapy throughout the cycle.

The hormonal method of treatment is the administration of 10 mg. of anhydrohydroxyprogesterone, 10 mg. daily for twelve days before the onset of the menstrual period. In some patients the administration of testosterone propionate parenterally, 10 to 25 mg. on the 15th, 20th and 25th days of the cycle, does equally as well, and when oral therapy is preferred methyl testosterone, 10 mg. per day for twelve days before the onset of the period may be used.

ROBERT B. GREENBLATT

TREATMENT OF CONGENITAL SYPHILIS

QUESTION: How soon after birth should treatment be instituted in infants having congenital syphilis? What is the preferred therapy and dosages?

M.D.—Ohio

ANSWER: Recent studies have demonstrated that penicillin therapy is efficacious in a high percentage of patients with congenital syphilis. Treatment should begin as soon as the disease is discovered. While the optimal dosage has not been definitely determined, it appears at present that the total dosage of 40,000 to 100,000 units of penicillin per kilogram of body weight should be given in divided doses at three or four-hour intervals over a period of eight to fifteen days.

In some instances the penicillin may need to be supplemented with some other chemotherapeutic agent (arsenic and/or bismuth). Sulfarsphenamine in dosages of 15 to 25 mg. per kilogram may be given intramuscularly once weekly for a period of eight weeks. Bismuth subsalicylate may be given in oil intramuscularly in dosages of 3 mg. per kilogram once weekly for eight to twelve weeks.

Supplementation of the penicillin treatment by these latter agents should be employed in penicillin-treated cases which relapse or show seroresistance persisting twelve months or more.

IRVINE MC QUARRIE